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Executive Summary

In 1986 the watchword for Information Centers is growth. The same may be said for the end-user communities they serve, and the computer technology they oversee. Much of this growth matches trends first identified in the 1985 AMA Report on Information Centers, and the current study establishes this as a landmark year for information technology and training.

Highlights and Conclusions. The data gathered through AMA's eight page questionnaire sounds a drumbeat: "more." By year's end, compared to 1985 levels:

> There will be more microcomputers in the hands of end-users: 44 per cent more.
>
> More of these micro's will be linked to mainframes or minicomputers: 55 per cent more.
>
> More mainframe and mini terminals will be at use: five per cent more.
>
> There will be more money spent on all sorts of microcomputer technology: 13 per cent more on micro hardware, 15 per cent more on peripherals, and 19 per cent more on micro software.
>
> There will be more Information Centers than ever to assist end-users in computer applications. A third of all these units are less than eighteen months old.
>
> There will be more end-users to be served: 21 per cent more than in 1985, and the share of senior managers among end-users will increase by 50 per cent.

The average number of end-user requests that Centers field will increase by 23.9 per cent, to an average of 193 per month. New Centers -- those formed in 1984 and 1985 -- are handling end-user requests at a 32.7 per cent rate of increase. "Mature" Centers -- those formed in 1983 and earlier -- experience a 14.2 per cent rate of increase.

The greater share of these end-user requests will continue to be calls for training in micro software, especially the most popular spreadsheet programs. More money will be spent on training: 19 per cent more, exclusive of staff salaries.

The number of end-users to be trained to use every sort of computer hardware and software will increase by 25 per cent. Of these, 22 per cent will receive self-instruction; 59 per cent will undergo training by in-house staff; 13 per cent will be trained by vendors of hardware and software; and 6 per cent will have instruction from independent trainers. Nine out of ten trainees will take instruction at their worksites.

For the first time, a greater number of training programs will employ computer-based training (CBT) than written manuals and/or audio cassettes. Use of the latter will remain static in 1986, but the number of programs using CBT will increase by 16 per cent, and the number of trainees instructed via tutorial disks will increase by 60 per cent.

For the first time, a majority of InfoCenters will have full-time trainers on staff. Large worksites will continue to have proportionately more trainers and administrators on staff, but MIS/DP specialists will continue to make up well over 60 per cent of all staffers.

There will be more people assigned to InfoCenter staffs overall: average staff levels will rise to 7.7 from 6.7 in all Centers, and to 6.9 from 5.6 at typical worksites (500-2500 employees, 46 per cent of the AMA sample).

Turning the Corner. By year's end, and for the first time, end-users at microcomputers will outnumber those at mainframe or minicomputer terminals. The reason: the number of micro's linked to mainframes and mini's will double in 1985. Connectivity and its cost are at the heart of this change. The price differential between a dumb terminal and a lively micro has narrowed from thousands to hundreds of dollars. Information Center managers have been quick to take advantage.

The tilt toward microcomputer technology has vibrant effect in each of the three major categories of InfoCenter responsibility: evaluations, authorizations, and training. Across the board, Information Centers are busier with micro's and carry more influence on their purchase and use.

Nine out of ten InfoCenters evaluate microcomputer software, and more than eight out of ten test micro hardware. Lesser numbers deal with mainframe technology: six of ten evaluate mainframe software, and only a third are evaluators of mainframe hardware.

When making a decision to buy, InfoCenter staffs place highest importance on vendor back-up and support; they are large customers and require much of the relationship with the seller. They count on hands-on testing or, failing that, the opinions of other professionals. They put stock in the editorial content of trade publications, but are wary of advertising claims. They'd rather do their own rating than count on subscription services.

They want products that are easy for end-users to learn and put to work. Range of applications is not a particularly high priority; neither is cost, nor volume discounts. IBM compatability matters a great deal.

InfoCenter Authority. Seven out of ten Information Centers must sign a purchase requisition before microcomputer technology may be bought for end-users. Their writ does not run to mainframe purchases; only a third must sign for mainframe software, and just 20 per cent for mainframe hardware. At the same time, they have a great deal to say about access to the mainframe and the database it holds. Six out of ten must approve micro-to-mainframe links and downloading of corporate data.

Such authority places InfoCenter staffs at the pivot of the organization's information flow, and keeps them busy with approvals. Half report "very frequent" requests for purchasing approvals of micro hardware and software, and four out of ten fielded requests for access to the installed micro base with similar frequency.

Training the Troops. Instructional tools, too, have turned a corner. Heretofore, most trainees received training through stand-up lectures and written materials, with audio cassettes often used to supplement self-instruction. In 1985 computer-based training, delivered via tutorial disks, gained parity with printed materials. In 1986 CBT will forge ahead.

Most InfoCenters directly train end-users, and their burden will increase by 24 per cent in 1986. For advanced training, most of which is specific to the needs of the worksite, staff instructors carry an increasing burden. This is very much to their liking. Gone are the days of holding hands.

Measuring the Costs. The issue of more micro's, more linkage, and more money spent on training invites questions about cost-effectiveness and ongoing cost justification. InfoCenter managers report a variety of ways to measure improved productivity. The most important of these are before-and-after studies based on rigid and quantifiable pre-justification analysis. Many others, however, see the benefits in terms of "soft" results: improved quality, easing the tasks at hand.

Only recently have vendors learned to target the Information Center as a specific market segment and to tailor both products and sales materials for IC staffs. Their task is to overcome a legacy of expertise -- no easy burden.

Taking Care of Business. AMA research findings run counter to the notion that the American business community is awash with under-utilized personal computers that came in the back door in various disguises. Computer power is being managed, albeit with varying degrees of success, in most organizations. The manner of this management is the subject of this Report.

INTRODUCTION

Research builds upon research. In the sixteen months since AMA published the 1985 Report on Information Centers, its survey office has fielded innumerable questions from fellow researchers about the size and scope of end-user computing in organizational settings, and about these new units which render assistance in the endeavor. It is telling that the single question most frequently asked is both impossible to answer and irrelevant to the issue. That question is, of course, "How many Information Centers are there?"

Like its predecessor, the present report does not attempt to number end-user assistance programs. Numbers we have indeed: this 1986 Report is built on more than five hundred responses to a detailed questionnaire and upon extensive interview activity with InfoCenter managers, vendor representatives, experts in mainframe and microcomputer technology, trainers, consultants, and end-users themselves. Its database is nearly four times as large as that for the 1985 Report, and its areas of inquiry are more extensive. The reader will find here, in charts and tables as well as in text, patterns of growth in staffs, machines, clientele, and expenditures. Two years of ongoing AMA research in this area, combined with the expertise of the editors of Information Center magazine, stand behind this Report.

But nowhere do we state how many Information Centers currently exist in corporate America. Instead, we rely upon the "critical mass" theory put forward in the 1985 Report and confirmed by this year's data. When a worksite reaches a "critical mass" of ten or more microcomputers or mainframe terminals in the service of end-users, it creates a unit to coordinate their use -- a unit which, though often placed within the Management Information Service/Data Processing department, is a separate and discrete operation with distinct patterns of staffing, responsibility and authority.

These units support and control the activity that advancing technology has made possible: the manipulation of data by the individuals who use that data (thus the phrase "end-user"). Heretofore, such activity required massive and expensive machines and expert knowledge of their workings. That is no longer the case, but neither is it true that computer hardware and software can be easily put to any business purpose, or that computer skills are easily mastered by non-experts. Information Centers are at the hinge of information technology as it swings from the expert to the non-expert.

The growth of Information Centers, therefore, parallels the growth of microcomputers and mainframe or minicomputer terminals at the work-site. It follows, then, that the first part of this Report is a histogram: a study of the end-user community and the machines at its service when the unit was formed, the objectives set for the new unit, and its staffing and expenditures at start-up. We then monitor the advances in all these areas through 1985 and the projected growth in 1986.

Finding that InfoCenter activity generally divides into four categories -- evaluations, authorizations, training, and special assignments -- we follow with a section on each.

- Evaluations require knowledge of end-user needs as well as critical judgments of available technology. Some vendors have been swift to identify the InfoCenter as a specific market segment -- and perhaps too swift in claiming that their products meet real-life requirements. The vendor-market relationship is a delicate affair fraught with misunderstanding and unrealized expectations. A close-up study, featuring interviews with nine major vendors of hardware, software and courseware, follows an analysis of data from the AMA questionnaire.
- Authorizations are bottom-line issues: who gets the technology, who signs the check. Moreover, once bought and paid for, the hardware and the software must prove their worth; major corporate expenditures require justification in no uncertain terms. The grail among IC managers, therefore, is a workable, reliable method of measuring end-user productivity. A study of this issue follows the presentation of data.
- Training, according the the 1985 AMA Report, was the veritable raison d'etre of the Information Center; the most statistically accurate answer to the question "What do InfoCenters do?" turned out to be, "They teach middle managers to use spreadsheets." Training was, moreover, a muddle of methods and middling results. The data for the present Report indicates that training is still a growth market, with emerging favorites in ways and means.

o Special Assignments take the Information Center into areas previously administered by other departments, and raise the whole issue of the new unit's identity within the organization. "Confessions of a Mainframe Man," a frank discussion of what end-user computing can do and ought not try to do, and of why the InfoCenter finds itself in outright competition with other organizational elements, follows the data.

The Information Center was born at a particular moment in response to a particular situation -- the development of affordable microcomputers and fourth-generation software languages, and their descent upon a workforce unfamiliar with the technology and unskilled in its use. Because of the special and unique circumstances surrounding its creation, its future is less certain than that of other organizational units. No one doubts that the finance or human resources or legal departments within a corporation will exist five years hence, however much their specific activities may change. Concerning the Information Center of the future, arguments abound. The AMA questionnaire offered InfoCenter managers the opportunity to predict the future; those visions were often diametrically opposite. There are respondents who foresee doing less applications programming five years hence, and respondents who foresee doing more; there are those who expect training to disappear from their agenda, and others who see no end to it; there are some who think their business will be entirely ended by 1990, and some who say that by that date the InfoCenter will be "the heartbeat of the organization."

All trust that information technology and its management will present an ongoing challenge to the intelligence and ingenuity of the scientists and technicians who develop the wares, and to the workforce that puts it to use. The 1986 AMA Report on Information Centers attempts to picture the ways in which people, machines and money are dealing with that challenge. In a work where numbers are inevitably at the forefront, the editors have foremost in mind the people which the machines and money ought to serve. The most heartening discovery in our 1985 Report was that the greatest benefits to accrue from InfoCenters were not technological but interpersonal. Backlog remained a problem; training was difficult and uncertain; applications sometimes failed to achieve a stated purpose. But with the Information Center as intermediary, the technologists and the end-users could speak to one another more gently and understand one another more fully. The present data confirms the finding in 1986. Those who count the numbers applaud.

1

YESTERDAY, TODAY AND TOMORROW:

A HISTOGRAM OF INFOCENTER GROWTH

The desktop computer is so much a part of ordinary corporate life that we may need to remind ourselves how recently the phenomenon of end-user computing came upon the land. Although some respondents proudly claim that mainframe computing power was in the hands of non-experts at their worksites as far back as twenty years ago, the original claim for a discrete end-user assistance program is made by IBM, which christened its first Information Center at its Canadian offices in 1976.

Information Centers dealt with mainframe and minicomputer users before the advent of microcomputers, and they continue to do so. Nevertheless, the development of high-performance micro's, and specifically the introduction of the IBM PC, sparked the formation of InfoCenters at a rate which has yet to slake. Among our sample, more Information Centers were formed in 1985 than in '84, more in '84 than in '83, and more in '83 -- the year the IBM PC made its impact -- than existed to that date.

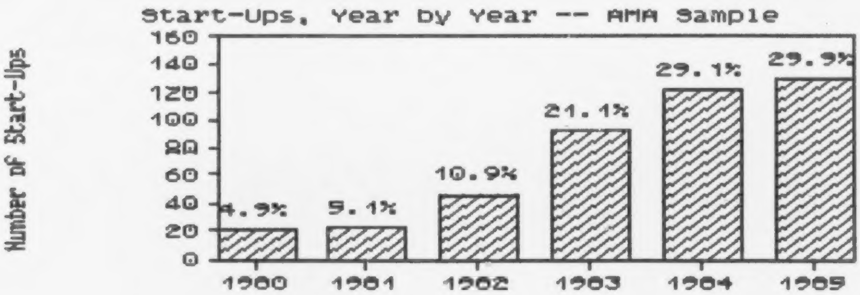

FIGURE 1. Information Centers Are Recent Arrivals

The AMA survey of 529 InfoCenters found 30 additional IC's -- 5.7 per cent of the total -- formed in the first quarter of 1986. Twelve respondents, or 2.3 per cent, gave no start-up date.

Corporate Environments. What kinds of organizations were first to give birth to Information Centers? Utilities and insurance concerns, oil companies (which had the money to spend in those salad days prior to 1984) and educational institutions (where timesharing and instructional uses paved the way) make up the largest shares of the "mature" Centers in our sample -- those formed prior to 1984. Business activity, however, did not prove an important indicator for the early presence of an InfoCenter. Organizational size is a vital factor; worksite description is another.

The recent past must be regarded as a period in which the smaller and mid-sized firms caught up with their larger brethren in terms of end-user assistance.[1] Last year's AMA Report estimated that eighty per cent of all billion-dollar corporations had Information Centers on line, compared to forty per cent of all American businesses. No surprise, then, to discover that the rate of growth in start-ups has leveled off in the larger firms, but continues apace elsewhere, especially in mid-sized organizations. Sixty per cent of our entire sample are "new" IC's, formed in 1984 or after; but among mid-sized firms, two-thirds of the InfoCenters came on line in the past thirty months.

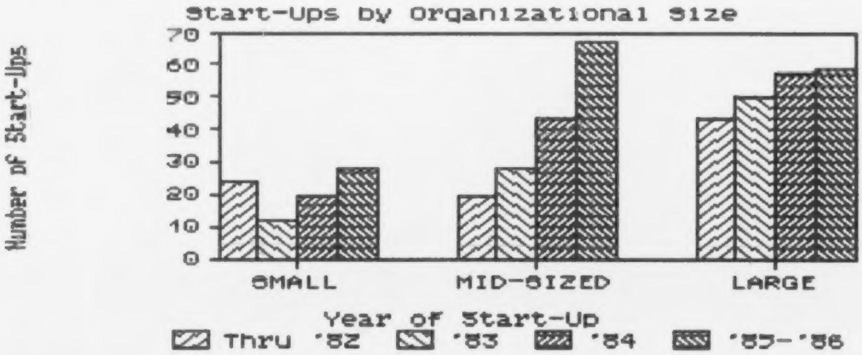

FIGURE 2. Start-Up Rates in Large Firms Have Leveled Off; Mid-Sized and Small Organizations Continue to Add Them.

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[1] In this Report, "small" firms are those with less than $50 million in annual sales (or budgets, if non-profit organizations); "mid-sized" firms have annual sales of between $50 million and $500 million; and "large" companies have annual sales exceeding $500 million.

As important as size, and allied with it, is the matter of work-site description. Information Centers first appeared at corporate headquarters, and only later at divisional branches or subsidiary locations. Half the Centers surveyed, whether mature or new, exist at corporation headquarters for a multi-unit organization; thirty per cent are located at divisional or subsidiary offices; twenty per cent are under the same roof with all other major units of the organization, exclusive of sales and service offices. Almost by definition, the latter category includes many more small concerns than mid-sized or large ones.

Technology: There is no question that the advent of affordable microcomputers was a driving force in the formation of end-user assistance programs. It must not be thought, though, that Information Centers are entirely the offspring of the micro. Fewer than half our respondents had as many as ten microcomputers at the worksite at InfoCenter start-up. Moreover, at most IC worksites, end-users of mainframe and microcomputer terminals outnumbered micro users at start-up and continued to do so through 1985. Only in 1986 have the numbers shifted to the point where IC's serve more micro than mainframe end-users -- and that only because the number of micro's linked to a mini or mainframe is doubling this year.

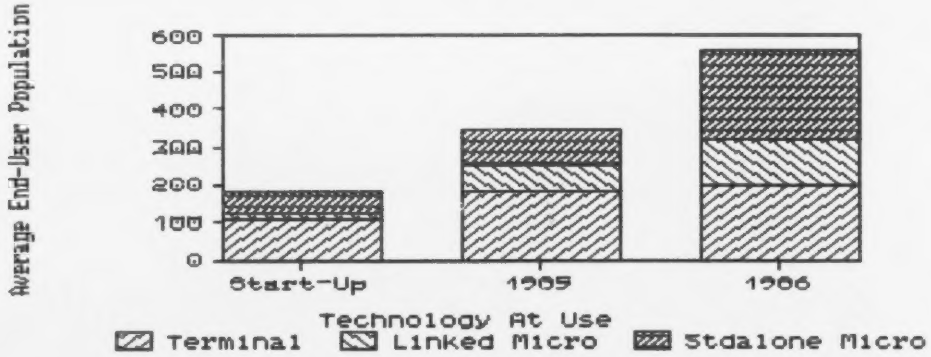


FIGURE 3. End-Users at Terminals Outnumbered Those at Micro's Through 1985; Linked PC's Are Changing the Balance in 1986.

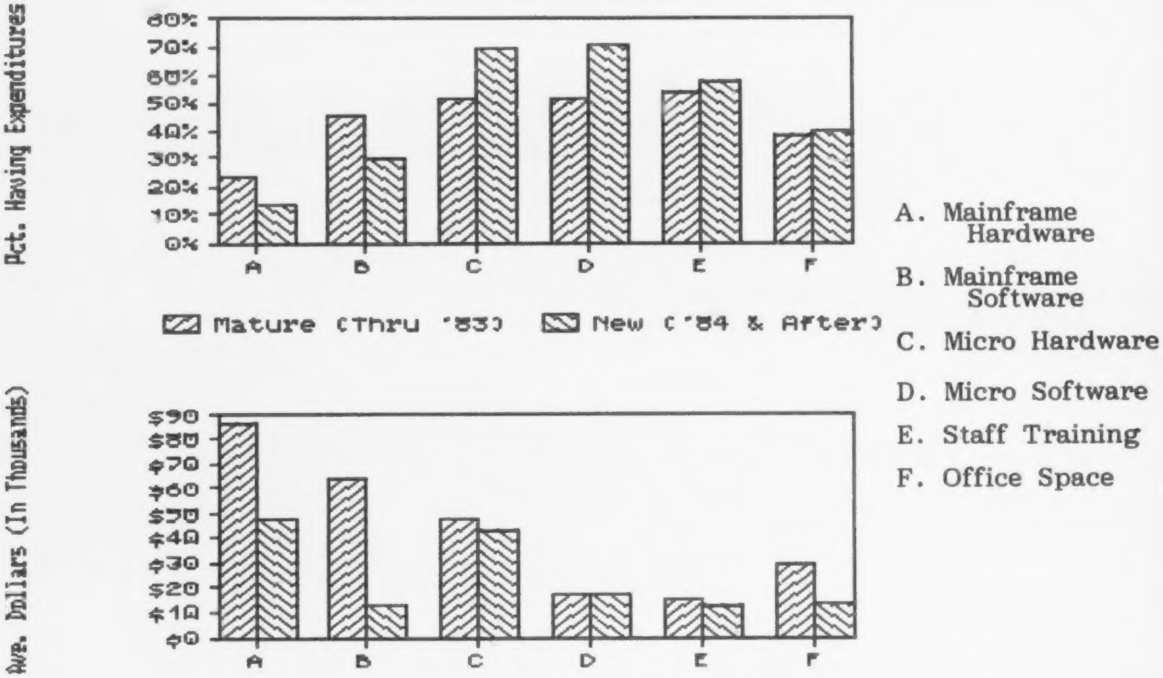
These points bear emphasis, as they address two common misconceptions about end-user computing. The first is that the issue is purely a matter of micro's. Figure 3 above puts that idea to rest. The second assumption is that InfoCenters were put on line to deal with uncontrolled and even chaotic situations: disguised purchases, unauthorized data use, and incompatibility sufficient to fill the divorce courts. No doubt these conditions existed somewhere, monuments to bad management and overselling by vendors great and small. They were exceptions. Far more often, an end-user assistance program was on line and tending to such matters as purchase authorizations, data security, and mainframe compatibility before any standalone micro's came through the door. A fourth of our respondent Centers fit into that category; another 18.5 per cent were in business before five micro's arrived at the worksite. Nor are these figures exclusive to mature Centers formed before the micro explosion; 46.4 per cent of the IC's born in 1984-86 were up before the on-site micro population reached ten.

Thus the Information Center was called into being to deal with the whole range of information technology, and often signaled a major restructuring of the MIS function within the organization -- an action that had as much to do with mainframes and mini's as micro's. That is less true of the newer InfoCenters, with their greater tilt towards micro expenditures at start-up, amid greater resultant savings on mainframe technology. Before 1984, the median start-up expenditure on IC-dedicated mainframe hardware was $75,000. For newer Centers the median has dropped to $12,500, and these days only half as many IC's spend any start-up money at all on mainframe hardware.

Costs: Start-up costs have gone down in most categories. The brand-new InfoCenter averages $51,200 on end-user-dedicated mainframe software, $12,000 less than what the mature IC's report. Start-up spending on dedicated micro technology has held steady while the cost- per-item has dropped; the $43,500 that new IC's average for micro hardware buys more than the $47,500 which Centers averaged at start-up prior to 1984. New IC's realize a similar advantage on micro software: their $16,600 mean expenditure goes further than the $16,700 averaged by mature Centers.

It would be misleading to add up the mean expenditures in each of the categories listed above and put forward an overall "average start-up expense." Each Center is born into a unique configuration of end-user needs, on-board technology and available funds. There is, however, a community of experience in terms of spending on dedicated microcomputer technology. Two-thirds of our respondents reported start-up expenditures on micro hardware -- that is, hardware for the Information Center staff and "host" micro's for end-users. The same share spent funds on micro software. That percentage was little changed by corporate size, worksite population, or worksite function.

Such was also the case for the dollar amounts spent. The overall average was $44,500 on micro hardware; the average at corporate head-



FIGURES 4 & 5. Start-Up Expenditures for Mature Centers Were Higher, and Included More Spending on Mainframe Technology.

quarters was $45,400, at divisional sites $45,400, and at single-site firms $47,000. The range of software expenditures was wider, but only slightly: an average of $12,500 at corporate headquarters, $15,100 at subsidiary locations, and $16,300 where all major units were housed together. There were far wider variations in start-up costs in every other category of expense, but it is a very good bet that forming an Information Center will require $60,000 in dedicated micro technology.

Because training is a prime InfoCenter function -- all the more so in its early years -- staff training expenses often include "training the trainer." Just over half our respondents reported expenditures in this category; half of those spent under $7,500. Newer Centers were slightly more inclined to spend start-up funds on staff training -- the figures were 53.9 per cent for mature centers, 57.8 per cent for those formed since 1983 -- but the actual dollar amounts dropped off to a $13,000 average for new IC's from $15,400 for older Centers.

Staffing: These start-up staffs typically consisted of three or four people, no matter what the worksite population or description. Less than twenty per cent of our sample had as many as five on staff at start-up, and the greater share of those served a gigantic worksite population -- five thousand and more. But even at those hugely populated locations, three-quarters of the IC staffs made do with five people or less. Staff levels at corporate headquarters were consistently higher than those at other worksites, but the average there was also under four.

Overwhelmingly, these staffers were recruited from the MIS/DP function. Seventy per cent of our respondent Centers were staffed exclusively with MIS/DP specialists. Despite the fact that newly-formed InfoCenters face daunting tasks of training, less than a third of them placed trainers on staff at start-up. Those with the wit to do so were likely to make do with a single trainer; only eight per cent of our sample had as many as two trainers on board at start-up.

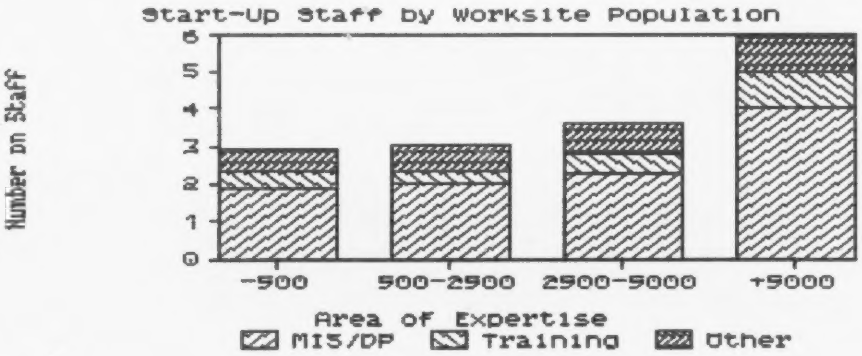


FIGURE 6. Start-Up Staffs Were Dominated by MIS/DP Specialists

"Others" include people with computer expertise from without the MIS/DP function (office automation, engineering and technical management are primary examples). There were also administrative personnel, and, where deemed appropriate, people from the departments the IC was to serve -- that is, staffers from the end-user community itself.

This variation is reflected in the expertise of InfoCenter managers at start-up. The overwhelming number were MIS/DP managers, but a significant percentage, almost one in five, came to the job with other qualifications. Five per cent had accounting, statistical or financial backgrounds; an equal amount were trainers. Generalists -- end-users, departmental managers, newly recruited MBAs, or unofficial office "gurus" with personal computers at home and enthusiasm for putting them to work on the job -- many sought out the challenge of running the new unit.

Reporting Relationships: In large and mid-sized companies, InfoCenters typically found themselves placed within the MIS/DP function, and IC heads reported to managers, vice presidents or directors of those functions. Such was the case for nearly four out of five of our respondents. In smaller companies, where it was not unusual to find the MIS/DP director doubling as InfoCenter manager, a larger share reported directly to senior management: an executive vice president, a general manager, a CEO. Small segments reported elsewhere: five per cent to office services or administrative managers, and a tiny .6 per cent to human resources or training department heads. Occasionally the entire InfoCenter was placed within an end-user department, and the IC manager reported to its chief; greatest among these examples were IC's within finance departments, totaling three per cent of our sample.

End-User Community: People who count numbers were the InfoCenter's first clients. Financial departments accounted -- no pun intended -- for nearly 30 per cent of all end-user requests fielded by the typical IC in its first year of operation, leading all other departments and functions by a goodly margin. Sales and marketing brought in another 14 per cent, and the MIS/DP function itself originated ten per cent of the IC's initial activity.

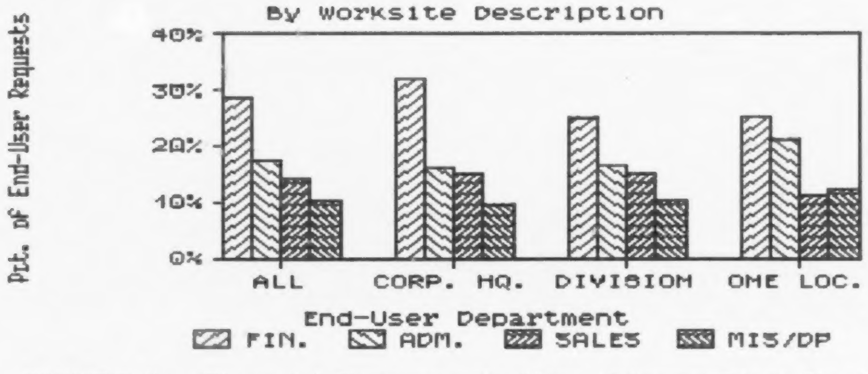


FIGURE 7. Financial Departments Were Primary Start-Up Clients

Administration dominated the rest of the IC's attention at start-up; 17 per cent of first-year end-user requests came from administrative sources. The remaining calls were split fairly evenly among human resources (7.4 per cent), manufacturing (6.5 per cent), and research and development offices (5.2 per cent). Another ten per cent came from various "other" sources, among them senior managers with wide-ranging responsibilities across departmental lines.

Senior managers, who naturally make up the smallest segment of a workforce, issued the smallest percentage of end-user requests at start-up. Middle managers and exempt/professional personnel dominated. The latter category covers a variety of staff and support functions that would not be classifiable as "senior," "middle," or "supervisory" management: scientific staff, engineers, planners, legal advisors, project teams, or internal consultants of any type. "Exempt professionals" also include those in finance and especially the MIS/DP function whose roles are more "professional" than "managerial"; a large number of programmers and technicians fit that definition.

In any case, the exempt professionals issued by far the largest segment of end-user requests at start-up. They were especially dominant at large-population worksites, which are likely to be manufacturing plants, where exempt professionals originated more than half of all the new Center's business in its first year. Research and development offices with their CAD/CAM requirements, factory-floor assembly technicians, purchasers overseeing just-in-time inventory techniques -- these jobs were facilitated by Information Centers coming on line.

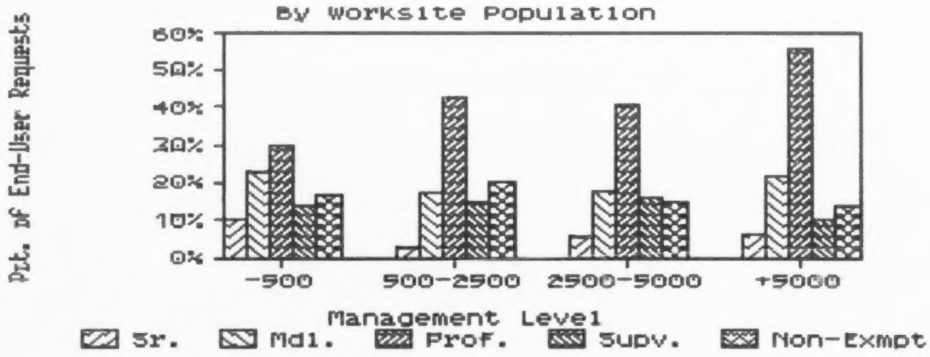


FIGURE 8. Middle Managers and Professionals Made First Call on the Newly-Formed InfoCenter, Especially at Large Worksites

Considering the degree to which they outnumber senior managers, supervisors and non-exempt hourly workers (including an army of secretaries and administrative assistants) made comparatively little call on newly-formed IC's. As we shall see, requests for assistance and training in word processing are second only to calls for help with spreadsheet software at most Centers; the reason IC personnel did not deal with word processing at start-up was that such training was already available from human resources and training centers that pre-existed the Information Center at most worksites. Only later did such duties devolve upon the IC.

Objectives. These matters of configurations, costs, staffs and populations were all secondary to the new unit's mission. What concerns prompted their formation? What objectives were to guide them?

The idea was to provide information as quickly and reliably as possible to people who needed it. Theoretically, it made no difference how this was done or who did it: mainframe or micro, MIS or end-user . . . invisible ink and carrier pigeon. What mattered was that people got the information swiftly and affordably. It was, and is, a matter of heated debate whether end-user computing could accomplish this mission at all, let alone more efficiently than a well-manned and well-equipped data processing department. DP backlog? Buy more mainframe capacity and hire more data processors. But although it is true that infinite resources make all things possible, it is equally true that resources are never infinite. In any case, organizations were bound to try end-user computing once the technology became affordable, and by 1983 the moment had arrived.

Students of management delight in this sort of study. Here was a task -- computing data -- previously reserved to one part of an organization -- the MIS/DP function. Here was new technology -- larger and faster mainframes and mini's, affordable and dependable micro's -- to allow the diffusion of this task. And here was a workforce unschooled in the new technology.

Enter the Information Center. Its objectives:

- To train and support people in the use of information technology;
- To allow access to corporate data while maintaining necessary security;

- To standardize end-user technology and ensure company-wide compatibility;
- To mediate relations between the MIS/DP function and other departments.

The relative importance of these concerns depended to a great extent on when the Information Center made its debut. The AMA questionnaire listed an even dozen issues in end-user computing and asked respondents to pick those which weighed most heavily in the decision to create an Information Center. A five-to-one scale was provided, a five to indicate great concern, a one little or no concern. Table 1 shows the percentage of respondents that scored an issue at four or five, indicating a high level of importance:

	Year InfoCenter Went Operational		
	1983 And Earlier	1984 or Later	Total
Training & Support			
Training in use of hardware	55.4%	60.1%	57.9%
Training in use of software	77.5%	71.9%	73.4%
Providing hotline service	56.4%	56.2%	56.2%
Directing a computer store	9.8%	12.1%	11.3%
Access			
Providing access to corporate data	62.2%	56.9%	58.8%
Protecting security of database	36.8%	42.5%	40.0%
Supervising micro/mainframe links	26.0%	38.6%	33.5%
Standardization			
Standardizing micro hardware	45.6%	63.9%	56.3%
Standardizing micro software	45.6%	64.6%	56.5%
Ensuring micro/mainframe compatibility	47.2%	40.2%	52.1%
Mediation			
Improving DP/end-user relations	66.7%	64.4%	65.3%
Easing DP backlog	52.0%	47.0%	48.1%

TABLE 1. At Start-Up, New InfoCenters Found Standardization and Access Issues of Greater Concern Than Did Mature Centers

Training and support ranked high no matter what the start-up date. So did mediation, in its dual meaning. Easing the famous (or infamous) DP backlog required a technical judgement: could the end-user do the job, or ought it rest with the pros in DP? Improving DP/end-user relations required interpersonal skills, explaining to each the needs and constraints upon the other.

In contrast, the issues of data access and standardization have proved more worrisome in recent days than they did in 1983 and earlier. This, of course, reflects the relative increase in the installed base of microcomputers and a corresponding decrease in mainframe terminal use that has occurred since 1984.

No comparison other than start-up date -- large firm or small, headquarters or branch -- reveals widespread variation, save that large worksites were more likely to install "hotline" services (their mean rating, on a 5-to-1 scale, was 3.66, against 3.38 for small sites).

We also asked respondents to rate the degree of success they'd achieved for each of these objectives. Before studying that table, let us first look at what has changed between start-up and the present.

Growth. Three-fifths of our sample has not had all that much time to change and grow. Those are the "new" Centers, begun in 1984 and after. Some went operational as recently as four months prior to publication, and more than a quarter of the total were 1985 start-ups.

Nevertheless, measured by actual figures for 1985 and projected totals for 1986, the demand for InfoCenter services is growing at a dramatic rate. On average, the number of end-user requests will increase by 23.9 per cent from 1985 levels, when the mean for all IC's surveyed was 156 calls per month; the rate of growth will be slightly higher (29.7 per cent) at smaller worksites, where the Information Center is more likely to be a new arrival. New InfoCenters of whatever size are handling end-user requests at a 32.7 per cent annual rate of increase, mature Centers at a 14.2 per cent rate.

Staffs are keeping pace. Start-up crews that numbered three or four people have nearly doubled; the average staff levels for all IC's by the end of 1985 was 6.7, and at large worksites that average had climbed to nearly 17. What had not changed was the proportion of trainers to DP specialists: in each category there are two today for every one at start-up. The number of administrative InfoCenter workers has likewise doubled.

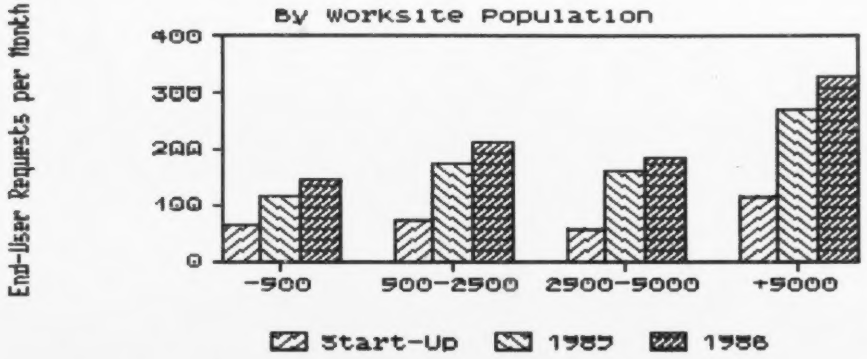


FIGURE 9. End-User Requests Are Rising at a 23.9% Annual Rate

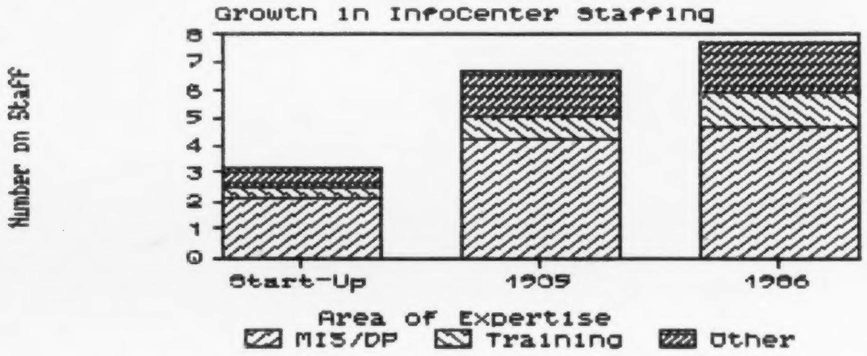


FIGURE 10. IC Staffs Are Growing at a Slightly Lesser Rate

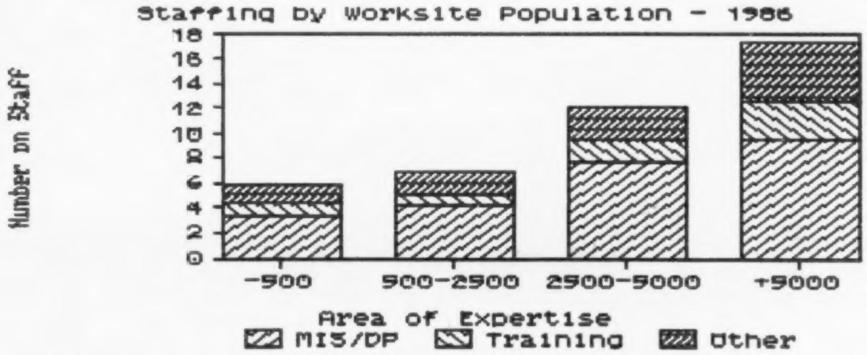


FIGURE 11. IC's at Larger Worksites Use Proportionately More Trainers and Administrators and Fewer MIS/DP Specialists

By the end of the present year, the ratio will have changed. To deal with predicted increase in end-user requests, InfoCenters will up their MIS/DP staffers by twelve per cent and their administrative help by an equal amount -- but the average number of trainers on IC staffs will rise by one-third. Data on training needs and requests are delivered in Chapter 4 of this Report, but here is an early indication of the demand and the response that InfoCenters plan. In 1986, for the first time, more than half of all Information Centers will have a full-time trainer on staff.

Our respondents expect no dramatic change in the source of these end-user requests. Middle managers and exempt professionals continue to account for half of all calls on InfoCenter services, as they did at start-up. Although requests from senior management have risen by nearly 50 per cent, this brings the level from a low 5.8 per cent of all requests to a not-quite-so-low 8.6 per cent. Nor has the pattern changed in terms of end-user departments (Figure 7). Finance still generates about about a fourth of InfoCenter calls, administration just under a fifth, sales and marketing roughly fifteen per cent.

As demonstrated in Figure 12, variations appear when we break out the six largest groups in the AMA sample in terms of business activity. They are, alphabetically, banking and financial institutions, which represent 11.3 per cent of the sample; government and military offices (11.2%); health care and medical providers (6.2%); insurance companies (10.4%); manufacturers of both industrial and consumer goods (17.2%); and utilities (8.1%).

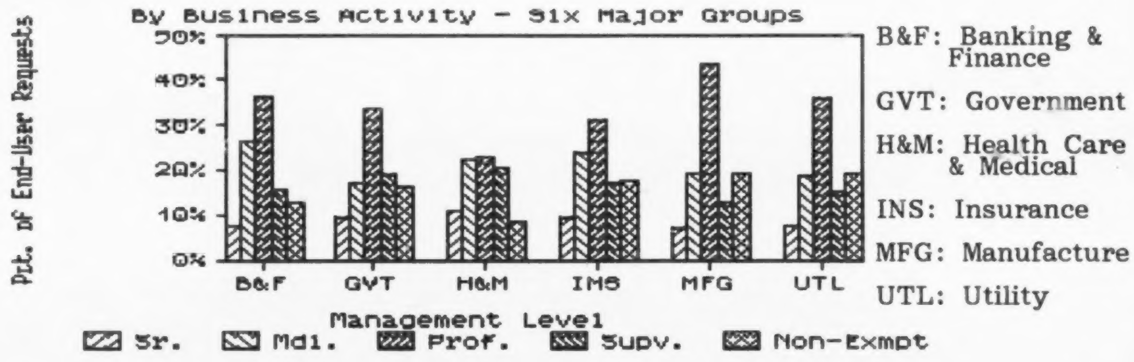


FIGURE 12. Exempt Professionals Dominate the End-User Population at Manufacturing Plants; Middle Management Ranks Highest in Banks, Financial Firms and Insurance Companies

Objectives and Actuality. As we have seen, Information Centers had stated objectives at start-up in four areas of end-user computing. When we asked respondents to rate the importance of a dozen specific issues in these areas, we also asked them to rate their success in achieving those goals, again on a 5-to-1 scale.

In three of the four areas -- training, access and mediation -- mature InfoCenters have higher success ratings than new ones; they've had a longer time to work at the problems. They are conspicuously more successful at improving software training, providing access to corporate data on the mainframe, and improving relations between DP and end-user departments. Newer Centers report higher success at standardizing micro hardware -- an indication that mature Centers would rather work with older incompatibles than replace them with new machines that align with the current standard.

	Year InfoCenter Went Operational		
	1983 And Earlier	1984 or Later	Total
Training & Support			
Training in use of hardware	3.87	3.69	3.75
Training in use of software	4.14	3.84	3.96
Providing hotline service	3.86	3.71	3.76
Directing a computer store	1.98	2.13	2.08
Access			
Providing access to corporate data	3.58	3.23	3.36
Protecting security of database	3.53	3.31	3.31
Supervising micro/mainframe links	3.30	3.37	3.33
Standardization			
Standardizing micro hardware	3.96	4.10	4.04
Standardizing micro software	3.73	3.98	3.87
Ensuring micro/mainframe compatibility	3.72	3.74	3.73
Mediation			
Improving DP/end-user relations	4.09	3.85	3.94
Easing DP backlog	3.12	2.95	3.03

TABLE 2. Rating Themselves On a 5-to-1 Scale, InfoCenters See Success in Standardization and Training. But Accessing Corporate Data Remains a Problem, and the Backlog Is As Yet Unbroken

The whys and wherefores that lie behind these success ratings form the body of this Report. We know the goals that Information Centers have set, the staffs at work to achieve them, and the end-user population that stands to benefit. To reach these objectives, Information Centers perform certain tasks which, like the stated goals, may be placed into four broad categories. The chapters that follow examine InfoCenter tasks and expenses in these categories:

- Evaluations of mainframe and micro technology.
- Authorizations of mainframe and micro purchases, of linkages, and of data transfers.
- Training in the use of mainframe and micro hardware, peripherals, and software.
- Special Assignments such as creating applications software, maintaining and repairing equipment, directing timesharing operations, and similar services for end-users.

Simply put, these chapters report what Information Centers do and how much they spend to do it. Having examined the environments that spawned end-user computing, let us now look into the day-to-day workings of those units assigned to support and guide the endeavor.

2

EVALUATIONS:

A SPIN AROUND THE BLOCK

Some InfoCenters train and some don't. Some wield authority to buy, others can't sign a check. Some write software, some are repair shops, and more than a few run computer stores. But when it comes to evaluations of end-user hardware and software, everybody's doin' it -- and everybody has an opinion.

That opinion is important, and not only to the end-users who apply to the Information Center for assistance in choosing hardware and software. Vendors ignore IC managers and staffs at their peril. The judgments formed at end-user assistance programs have a multimillion-dollar impact on an industry seeking a way out of a two-year slump. Those aware of the InfoCenter's role as in-house consultant on computer technology gain an inside track on eventual sales and rentals of not just micro but also mainframe technology.

What's at stake? Here's what respondents bought to support end-user computing in 1985:

- An average of $162,500 on new mainframe and mini-computer hardware, $89,000 on upgrading existing machines, and $58,900 on new terminals.
- Another $50,000 on operational mainframe software, $46,100 on applications software, and $42,000 on telecommunications equipment for end-users.
- The total on mainframe and mini technology: $448,200 -- and that average includes those who spend nothing in these areas. The average among who did spend here in '85: $513,500 on new computers, $222,400 on upgrades,

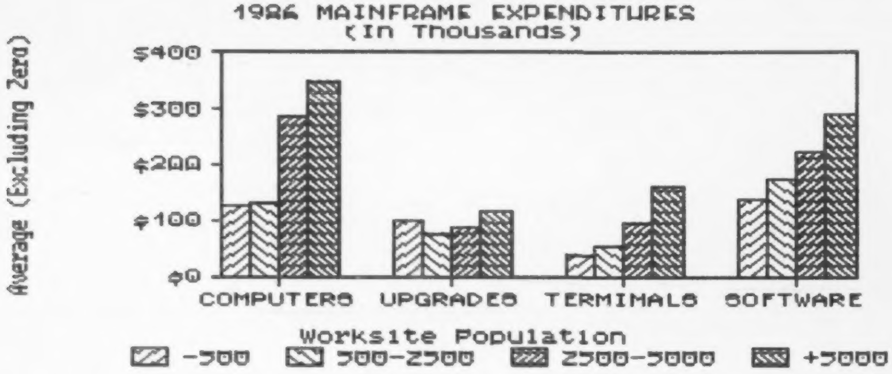


FIGURE 13. The Average Purchase Of Mainframe Technology Will Top $1,000,000 in 1986 . . .

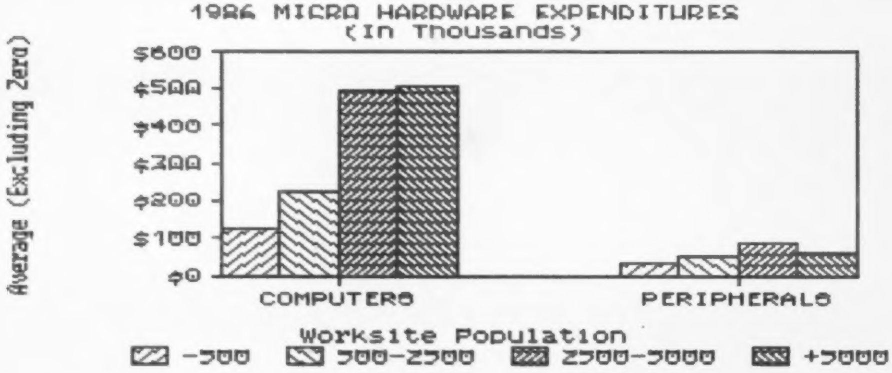


FIGURE 14. Another Quarter-Million For Micro Hardware . . .

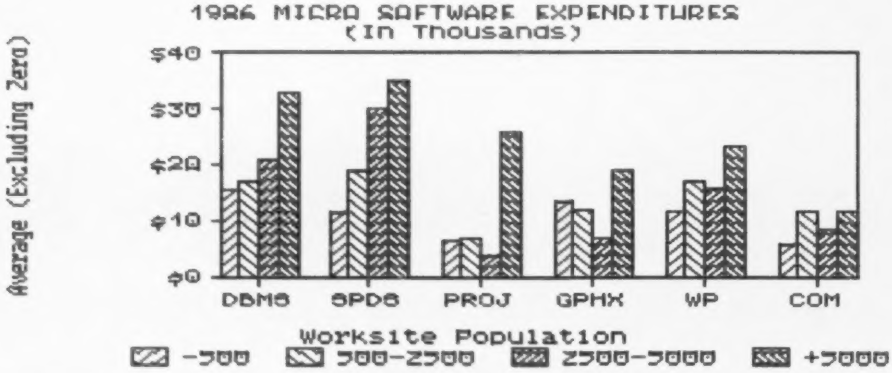


FIGURE 15. And $54,500 For Various Micro Softwares

$101,100 on added terminals, and $320,500 on various softwares. Grand total, mainframe: $1,157,600.

o On to micro's: among all respondents, average expenditures on new microcomputers totaled $208,200; on peripherals, $28,900; on all softwares, $45,300. That's a grand total of $282,400, and again includes the relative few who spent nothing in these areas. Eliminate the non-spenders and the average leaps to $340,300.

o The figures are going up in 1986 -- though not by much. The projected increase in spending on mainframe technology is 5.9 per cent, to an average $474,600; on micro hardware and peripherals 7.4 per cent, to $254,700. Micro software is the brightest area, where spending will be up 19.4 per cent, to $54,100.

The market remains tough and competitive. Still, survey respondents report an average of $837,500 budgeted in support of end-user computing in 1986, and simple multiplication leads to the conclusion that by itself, the AMA sample of 529 InfoCenters will oversee spending of nearly half a billion dollars.

The size of the market is demonstrable. But what role do Information Centers actually play in the allocation of these huge amounts?

Consultancy. Most InfoCenters play a consultative role prior to the purchase of end-user technology, and some have to sign the requisition. Seven out of ten IC's must be consulted before money is spent on either hardware or software for end-users. Somewhat fewer, but still a majority, must approve the purchase. Authorizations are the subject of the next chapter of this Report; the present matter is the InfoCenter as evaluator. How many IC's play this part?

As the man said, everybody's doin' it. Evaluations of micro hardware are the daily fare of 85 per cent of respondent Centers, and 91.5 per cent evaluated micro software. A lesser percentage grade out mainframe and minicomputer technology, but still a considerable number of IC's are active in such evaluations: six out of ten check mainframe software, and more than a third evaluate mainframe hardware.

Information Centers must put effort into evaluations because they are so frequently asked for an opinion by end-users. Requests for assistance in hardware and software selection come thick and fast, and require a matchmaking role between the end-user's requirements and the capabilities of the technology. The AMA questionnaire asked respondents if they field such requests and provided a three-to-zero scale to rate the frequency of each type of request. (A three indicated that such assistance was very frequently requested, a zero signified that no such requests were received in 1985.) Table 3 below gives the results.

Nature of Request	Provide Such Service	"Very Frequent" Request
Assistance in Hardware Selection	90.8%	41.0%
Assistance in Software Selection:		
Spreadsheets	89.8%	50.5%
Database Management	89.2%	34.0%
Word Processing	87.1%	47.4%
Graphics	85.2%	25.1%
Communications	81.8%	19.1%
Project Management	75.4%	9.6%

TABLE 3. Most InfoCenters Evaluate Hardware and Software; Most End-Users Seek Help in Choosing Spreadsheet Packages

Sources. As they evaluate new products, Information Center staffers trust their own experience first and foremost, and close after that the opinions of professional colleagues. We asked respondents to rate various sources of information on a five-to-one scale, with five indicating great importance and one little importance. Table 4 on the facing page shows the percentage of respondents who gave a four or five to each source, and the average rating overall.

Beyond one's own personal interaction with the product or the direct report of others, the most respected source of information on new products is the editorial content of trade magazines. Just as clearly, the advertising content of those magazines is highly suspect. Worse still is the reputation of advertising directed to the mass market of end-users, be they in the home or office. The chasm between vendor claims and professional opinion is so vast, and has been for so long, that some marketing managers for major vendors have begun to pull up the reins. A recent television spot for Tandy broke new ground by admitting that hardware may actually fail to perform as expected. The thrust of the ad is Tandy's service and support.

Information Sources	Average Rating	Pct. Rated 4 or 5
Hands-On Testing	4.59	89.8%
Word-of-Mouth	3.77	65.2%
Professional Meetings	3.58	57.2%
Vendor Material	3.48	49.3%
Vendor Representatives	3.11	32.1%
Trade Publications:		
Editorial Content	3.78	64.8%
Advertising Content	3.10	31.9%
Mass Market Publications:		
Editorial Content	3.03	29.5%
Advertising Content	2.64	16.4%
Subscription Rating Services	3.10	38.1%
Computer Shows	3.06	34.4%

TABLE 4. In Evaluating Hardware and Software, InfoCenters Distrust Vendor Claims, Forming and Sharing Their Own Opinions

Of all that vendors do to put out the word about their product, it's the "tech specs," the technical specifications of product capacity and capability, that are most trusted. Information Center staffs ignore the headlines and slick copy and go straight to the small print to find out about the speed and dexterity of hardware and the flexibility of software. Then, turning it on and booting it up, they put the product through its paces and draw their own conclusions.

Criteria. Through these sources, Information Centers investigate what's important to their own operations. Naturally, different criteria apply to hardware and software. Nevertheless, rated for importance on a five-to-one scale, three considerations are foremost: vendor support, ease of use, and IBM compatibility. (In judging software, ease of instruction joins the other three at the top of the list. The figures are on Table 5 on the following page.)

Of all criteria used in judging hardware, "vendor back-up and support" leads the list. "When I've bought eighty microcomputers I want the vendor on site and holding my hand from the moment they arrive," said an IC manager for a New York-based financial institution. "I want him to be my best friend."

For both hardware and software, where vendor back-up is also a leading concern, customer service considerations -- toll-free hotline numbers, training-the-trainer sessions, the reliability and clarity of instruction manuals -- all are important to hardware and software purchasers, and many disappoint. "I defy anyone to follow these things beyond page five," a midwestern IC staffer complained. "They're written in Chinese."

	HARDWARE		SOFTWARE	
	Average Rating	Pct. Rated 4 or 5	Average Rating	Pct. Rated 4 or 5
Vendor Back-Up/Support	4.36	80.4%	4.16	75.8%
Ease of Use	4.29	80.9%	4.69	95.3%
IBM Compatibility	4.29	77.2%	4.17	75.0%
Range of Applications	3.97	66.4%	3.68	56.4%
Ease of Instruction	3.94	65.2%	4.35	85.0%
Mainframe Compatibility	3.84	63.5%	3.30	43.7%
Cost	3.74	57.3%	3.63	53.9%
Volume Discounts	3.35	48.5%	3.19	43.8%
On-Line Help Facility	3.09	35.8%	3.78	61.4%
Tutorial Mode	2.95	29.1%	3.60	55.4%

TABLE 5. In Both Hardware and Software, Cost Is Secondary To Ease of Use, Vendor Support, and IBM Compatibility

The single most important concern to InfoCenter evaluators of software is, naturally, ease of use -- that is, easy for end-users, not the professionals on the IC staff. This is overwhelmingly true when judging software. "User-friendly" is no mere slogan to those who must train, assist and support non-experts. It applies to hardware as well, where it ranks a close second to vendor support. Ease of instruction is significantly more important in software products than hardware.

Cost does not rank high in comparison to other issues, yet it remains an important concern in choosing among competitive products. Of course, "all else being equal," InfoCenter staffs will recommend the less expensive machine, but all else is rarely equal. Comparative cost is one reason that IBM "clones" linked to the mainframe are squeezing sales of terminals. Eighteen months ago, the decision lay between an $800 terminal and a $2400 PC. Today the gap has narrowed from $1600 to less than $500, and the additional benefits a micro affords more and more outweigh the cost differential.

CLOSE-UP

Consenting Adults: The Vendor-IC Relationship

The time was August 1984; the place, Boston; the event, the First Information Center Conference & Exposition. By AMA's invitation, a dozen representatives of computer hardware and software gathered privately to talk (on a "don't quote me" basis) about the thousand conference-goers who were clogging the exhibition aisles in search of solutions to the myriad problems posed by end-user computing. And the question central to vendor concern:

Who are these people?

Into this mother river flowed streams of allied confusions. What expertise do these people have? Are they programmers? Processors? Computer scientists? Or are they trainers -- they seem to ask so many questions about training! What kind of hardware do they want to know about? What sort of software? And, most important to this group of salespeople, what authority do they wield? Can they issue purchase orders? Can they sign a check?

Those dozen men and women mirrored the wider confusion of an industry facing its first contraction after a decade-long burst of historic growth. Operating with few facts and figures about this brand-new "end-user computing" market and even less information about these "IC manager" customers, many vendors resorted to a classic ploy. A salesman faces a customer with his goods in a suitcase, and tries to ascertain the customer's needs; unable to change what's in the suitcase, he must therefore try to change the customer's mind about what he needs. The short-term result may be a sale, but in the long run a customer -- and a reputation -- is lost.

And in mid-1984 vendors were acquiring a bad reputation in the microcomputer marketplace. The public had been oversold, not on the micro's speed or capacity or the software's utility and dexterity, but on the ease with which this power could be put to use. "I don't believe anybody," said an InfoCenter manager at a New England public utility when he was interviewed for AMA's 1985 Report. "This business is worse than the used-car business. There should be some kind of truth in advertising bill."

In business settings, the Information Center acts as a buffer between the vendor and the end-user. IC's were charged with facilitating use of both micro's and mainframe terminals by non-experts. The InfoCenter needed tools to do the job; the tools in the vendor suitcase quite often were not proving out as advertised. Hardware and software, peripherals and enhancers, training methods and training-the-trainer programs -- most fell short of the expectations the vendors themselves created for their products.

This dicey situation moved vendors into action. Each in its own way, major suppliers of end-user technology investigated the market and drew conclusions from their findings. Although there is disagreement among them as to the finer points of InfoCenter responsibility and authority -- and difference, too, with some findings of the present AMA Report -- most feel they have a sure sense of what IC's are about, and a conviction that they have the products to meet the need.

Is it true? Listen as nine major suppliers describe the InfoCenter as they see it today, two years after that joined confusion in Boston. We probed their representatives for their views of how the Information Center evolved and will evolve as a specific market segment for the computer industry; how they reach that market, and how they serve it with their products. In short, we asked them to open up their suitcases and show us their goods.

Data General. The Massachusetts-based Data General Corporation is a leading supplier of minicomputers to the Information Center market. Their spokesman, Gregory Jarboe, Manager of Public Relations, subscribes to the "pc's through the backdoor" theory of InfoCenter evolution. "People were smuggling in the little machines through Lord knows what budget -- paper clips & supplies," says Mr. Jarboe. "Information Centers are one tactic in a strategic effort by MIS organizations in Fortune 1000 companies to turn chaos into a system."

Aiding the effort to create a system was a change in end-user perceptions of the possible. "The pc users learned there were limits to what you could do all by yourself. So the clamor became, 'We all want micro to mainframe links.' Technologically as well as economically, that was probably not going to happen soon. All of that is the tip of the iceberg. What is really happening today is that MIS is essentially redefining its role (in the Fortune 1000 companies we deal with) to providing those end-users with services. Not all have adopted an IC. A number have. The larger trend is that MIS is owning up to leading this parade versus following it. They sit on the committees, try to set networking architectures, and use other techniques to bring all these independent pc users into the information system fold."

Does Data General target the Information Center directly in its marketing efforts? "No, we don't go out targeting. We don't say, 'Let's find every IC in the Fortune 1000 and send literature or call there,'" says Mr. Jarboe. "What we do see is that people who run the IC by and large report up to the MIS function." Indeed they do, according to AMA survey respondents. Two-thirds of them report to MIS/DP or Office Automation officers, and the percentage increases with the size of the organization. "Of course we target MIS," Mr. Jarboe adds.

In Data General's view, Information Centers not only report to the MIS function but also have their evaluatory roles and purchasing authority strictly controlled by MIS. "Generally it's been prescribed -- somebody they report to has given them a list of three hardware vendors to do business with, the fifteen software packages that they will support -- or if the IC has a software package that isn't on the approved list that they think should be evaluated, they can try to get it on the list at the next review committee."

Data General salesmen, therefore, make calls on Information Center managers only "if it's in conjunction with the overall systems sell," according to Mr. Jarboe. "Decision making authority in half the organizations we call on has been distributed around the table. You can't simply get the MIS Director approval for the contract -- you have to sell a committee. That means you have to spend time with the people running the InfoCenter and convince them that the training and support issues are satisfied: 'training-the-trainer' sessions for technical questions, an 800 number, etc. We have to do a lot of work with IC people -- they generally have a different agenda and you have to convince them just as much as you do anyone else in MIS that you're a full service vendor, not just selling boxes."

Neither does Data General tailor its advertising specifically to the Information Center staff. "We have two flavors of advertising, one targeted at the key decision-makers -- and that's the MIS Director or DP Manager or whatever in large organizations -- and the other is aimed at general computer users en masse -- IC people and those who are out there using computers. Although we have not targeted the IC per se, they may read the same publications MIS people do or see the same TV programs the general public sees."

Speaking of advertising, we asked Mr. Jarboe if vendors hadn't created a credibility gap with claims for their products that far outstripped the truth, especially in their use of such terms as "user-friendly" or "good for all purposes."

"Absolutely," he responded. "If we're talking generally for the industry -- absolutely. The myth that got perpetrated is that if you could start your car's ignition and drive to work in the morning, then it was just as easy to figure out how to work a computer. And anyone with a reasonable amount of intelligence could learn to do both in the same amount of time."

The way to close the credibility gap is with products that do, in fact, meet current market needs. We asked Mr. Jarboe how Data General reads the situation now. What are the IC's major needs in 1986?

"At the top of the list is what we would call pc integration," he answered. "The market research we've come back with shouts this. The revolution already took place in '83-'84, the peak years for pc buying. The major issue they're wrestling with is not the simple stuff. They're now asking for technological help with a standalone pc that was never intended to be part of a corporate-wide information system, and they want all the things a corporate-wide info system can give. But they don't want to give up their pc to get it -- because they've invested money in buying it, and the time in learning how to use it, which is probably worth more than the hardware itself.

"As a technological problem, it's not the IC manager's to solve," Mr. Jarboe continued. "It's the computer industry's problem -- and the vendor's opportunity. If we know that's what they want, then we ought to be clever enough to build something and provide it at a cost that's not prohibitive. To be able to protect their investment in pc's, we must find a way to link them to the minicomputers and the mainframes already there, to link them to other pc users and to outside data bases. That's the holy grail right now that everyone's in search of."

Data General is also aware of the compatibility issue. "We're willing to adapt the IBM PC itself as an extension of our own product line," said Mr. Jarboe. Philosophically we have an open systems architecture -- it doesn't matter who the installed base is, we need to be able to accommodate it in order to sell pc gear. We were the first company to provide an IBM SNA product, also the first to provide a Wang interface. We support all the industry standard communications. The thrust we're working on currently is to take the IBM connectivity issue and turn it to an advantage for Data General.

"So yes, we have the products today, but we also know what we're up against strategically and how important timing is," Mr. Jarboe concluded, with a bow to public perception. "Until it is cost effective and easy to use -- and the consuming public defines both of those -- then you don't have a solution."

Digital Equipment Corporation. DEC competes closely with Data General in the minicomputer market with its VAX and associated products. Jean Bonney, DEC's Product Marketing Manager for Large Systems, has been involved with end-user computing for more than twenty years and appreciates its recent accelerated growth.

"When the term Information Center was coined, it was a mainframe-based thing," Ms. Bonney recalled, "but then all of a sudden there were these personal computers out there, and end-users didn't have to depend on a lot of other people. They could just bring in the pieces of equipment, and they found out that they could do a limited number of things fairly easily. I'm delighted as a vendor. We have an opportunity to tie a lot of things together and to use technology to increase the productivity and the quality of decision making."

DEC differentiates between product for the DP department and product for the Information Center. "The Information Center manager wants software products that non-technical people can learn in a short time," said Ms. Bonney. "A lot of the Information Center's clients may use something once a month, and they want to be able to just turn it on and make it happen, get the data, get the information they need.

"I also think that Information Center managers are looking for help in making their environment successful. It is a new and different kind of venture, and I think that they are looking for some management support, some help in deciding not only the technology, but also the services to provide. There's a lot more emphasis on interpersonal things. It's not just technology. They're managing expectations."

That pungent phrase "managing expectations" demanded fuller explanation, so we asked Ms. Bonney to expand upon the concept. "Okay, you open up an Information Center," she replied. "The end-users say it's what they've been waiting for; now all the data that they want and all the processing that they need they can just do. They don't realize that even though there are some user-friendly types of software and computer-based instruction and even training for the Information Center staff itself, it's difficult. It's a new way of doing things. It takes a while for an Information Center to work with whoever is the keeper of the data in order to get the data into a format that's most appropriate for the business people. You can't just start off with the data, give it to the users and let them go to work with it. They have to start small. Maybe you start with one department. You decide whether you're going to write code or not, whether you're going to do consulting, how many people you can support -- if you have three people in your Center, can you support two thousand end-users? How much support do you have from the corporation?"

With "support" now a key word, we asked about Digital's commitment in this area. "Digital has won several awards," Ms. Bonney reported. "One this year was specifically for service. We provide training, technical support for installation, and what we call "residencies" for systems work as well as product applications. Those are fairly standard things across our product line. Our training courses are a little less technically oriented than we've done before. They are much more into management planning for pc-to-larger network interfacing.

"That is a new service for Digital -- direct management consulting and support. We've been more in the scientific and laboratory end of the business, and I think their needs are different from the needs of the commercial environment. The engineering and technical environment has been getting to the real leading edge, using computing to the limits of the product, whereas the commercial world looks for the more stable product, the thing that works, that gets the job done."

Entering the world of end-user support has led Digital into new products as well as new applications for existing ones. That includes a set of software that provides functions needed by a professional end-user -- a financial analyst or marketing analyst. "We have our software front-ended by our all-in-one product, which we use as a navigational tool and a menu driver," Ms. Bonney explained. "You enter into our system, and it will ask you whether you want to go to a specific application that your department might have set up, or if you want to go into the Information Center 'tool box' environment, which gives you a list of all the tools.

"Our product combines all the office automation capabilities with the analytical capabilities, statistics and financial modeling and report and query generation. So it's no longer a case of having word processing here and mail there and calendar somewhere else. It's really all together, so that the professional has one environment that satisfies almost anything he or she can do."

Like Data General, Digital has come to deal with the multivendor environment -- which is to say, with IBM compatibility. "Our strategy is very much co-existence, and in fact we can communicate with other vendors a lot better than some of the other vendors themselves. An IBM PC hooked up to our VAX can use the VAX as an extension for disk storage, for peripherals, or for data storage itself. Digital is also committed to providing the best communication with the data processing department.

"There have been enough turf battles over the years between who owns what and who is responsible for what," Ms. Bonney concluded. "We can't afford to have battles now."

Tandy Corporation. A leading supplier of micro hardware for the home market, the Tandy Corporation, the Dallas-based corporate parent of Radio Shack, is seeking inroads to the organizational market. Carroll Reeves of Tandy's Special Marketing Department cuts through the question of defining the Information Center by accepting the prospective client's definition. "It doesn't matter what we think," Mr. Reeves explained. "If we're calling on a company that views Information Centers as a consultant, we view them as a consultant. We have to respond to all of the ways companies might view Information Centers."

Tandy salesmen do call on InfoCenter managers, but use the same material as that developed for DP managers. Their sales material is "targeted for a class of functions within a major company," Mr. Reeves said. "If the company has clustered those into the DP manager, he's the one we're shooting at. If it's the IC manager, he's the one we're going after."

Tandy sees IC purchasing authority as less independent today than two years ago. "They [the Information Centers] are coming under the jurisdiction of departments, because typically everyone has the image that down the road their micro's may connect to the mainframe, so compatibility and connectivity are very important. That puts the DP manager and his staff in a consultant mode if they're not in a control mode of the Information Center."

Tandy, then, puts no special "spin" on marketing materials for the IC. "It's considerably different from the home market, but it's exactly the same for the DP market. We emphasize education and fun and business for the home, whereas for the companies -- for IC and DP/MIS -- we put more emphasis on connectivity, compatability and price -- because price is certainly important. But compatability, together with all the other elements of the total information resources of the corporation, is emphasized."

Tandy advertising now deals frankly with the "credibility gap" created by an earlier generation of television commercials. "Anyone that can take a hat factory and go from chaos to sheer joy by putting in a PC is absolutely a genuis -- he can walk on water without even getting his tennis shoes wet," said Mr. Reeves. "We don't allude, either on-screen or off-screen, that it's going to be simple or easy. We do say that we feel there are improvements that can be made, and we stand ready to assist anyone in understanding those improvements and implementing them."

What Information Centers require, then, is "concise, accurate information about exactly where our industry is today," Mr. Reeves continued. "What I mean by that is that the IC's job is to remain abreast of all the technology relative to information management. We answer the need by our basic approach to sales -- and that is in the evaluation and recommendation of solutions, as opposed to mere hype."

Information Builders, Inc. If Tandy is willing to accept any client's idea of what an Information Center may be, the marketing department at Information Builders, Inc. has an exact, almost textbook definition. It was given us by Don Wszolek, vice president for marketing at the New York-based firm that developed FOCUS, a widely-used database management and report-writing software package.

"IC's, for the most part, now come organizationally back under the control of MIS and are primarily charged with the delivery of end-user computing to line operations within the company," Mr. Wszolek specified. "Within that there are several functions -- one of which is a training function on the products that are selected to be used by the IC. There's also a support function of the users of the IC, so that they can call for help and advice on different products, and there's IC product selection in a management role in the IC."

Such an exact definition gives evidence that Information Builders sees the IC as a specific market for FOCUS. "Oh yes, definitely, a major market segment," Mr. Wszolek agreed. "In most companies these organizations have quite a formal structure, and in some companies a very large constituency."

And do they have separate purchasing authority? "To a certain degree," said Mr. Wszolek. "They have certain budgets -- direct software budgets -- or they have a strong say in product selection of how an overall piece of the MIS budget would be expended. I don't think they have any independent budget for hardware and peripherals expect perhaps to cover pc's. They would certainly be asked for input into requirements planning in that. If they're adding another 100 or 200 users onto a given CPU, they have to plan for additional CPU's and disks. The purchasing is not done by IC people, but they have a strong influence, because a lot of successful IC's may be the largest consumers of those resources during the daytime shift. So they probably have some influence on what hardware is needed -- assuming that they want the function to grow."

Anticipating that growth, Information Builders advertises directly to the IC manager. "He is one of the targets," Mr. Wszolek reported. "We do direct mail. It's a different message from that for MIS managers, but the same type of material. The IC people are now more intimately in the reporting structure to MIS, so there isn't as strong a need to have an entirely separate message. We use computer trade publications most typically. We don't advertise in business publications. We use just about all the computer trade publications. Obviously, we use Information Center magazine -- which is the only one that's specifically directed at that person. We're a 12-time-plus advertiser in that. In terms of overall budget, IC folks may represent 20 per cent.

"A number of our ads are generic in that they would appeal to both -- talk to both. They'd identify a common problem, like applications development. A mature IC does do smaller types of systems application development. So they have similar needs to people who are doing more complex systems."

"There are specific things we would do in a sales presentation itself," Mr. Wszolek continued. "There's a special section that just addresses the IC, in terms of all the issues: support, training, product, capabilities, and bugs. We have specific pieces of marketing material that just talk to the IC."

Mr. Wszolek does not think that the famous "credibility gap" in advertising and marketing materials is unique to the computer industry. "I think that's a problem that's generic with advertising as a whole. It has nothing to do with IC's. Advertising's major mission is to create awareness. There may be fewer than 4,000 IC managers, or titles that even vaguely resemble that. And yet the readership of a magazine like Computerworld or Datamation is 150,000. You're going to get a lot more end-users looking at the same ads as IC managers. Consequently, in a given company, there may be 20 people who have been wanting to get end-user computing and they see this ad for a product that seems to match us with what they need, and so they start lobbying for it.

"Vendors try to create awareness among the end-user community because products try to acquire champions in a company. If you can get an end-user as a champion who has a budget for half a million dollars, well, software people want to reach that person, even if that person might not be the Information Center manager.

"The question of unrealistic expectations, I think, is a matter of degree," Mr. Wszolek went on. "Some vendors are pretty egregious in doing that and some are not. Where it is egregious, I think it's a purposeful strategy which may not be that moral. In some cases, though, vendors may not have a lot of interaction with their advertising agencies -- consequently, may not provide a clear enough definition of what their product is supposed to do -- or in the heat of doing ninety-nine other things -- may quickly approve the new ad without thinking too much about the craftsmanship that went into certain claims or promises.

"Ease of use and user-friendliness are terms that had some meaning three years ago, but today they are hackneyed. Basically we don't use them. Everyone is implying their software is easy to use or no one would buy it. It's a matter of whether you can do effective work with it. We try to couple it with other notions, and as you start to do more difficult things with it, the question becomes what happens when you take the training wheels off the bicycle. Do you fall over or do you continue to ride?"

The Information Center must help end-users continue to ride. What vehicles do IC's need for the journey?

"The mature IC that has been in business a couple of years now faces more with training and support issues, rather than product selection. People have pretty much got their set of software, their core products. What matters are support issues. Pacific Telephone -- how do they train 7,000 people in FOCUS? Those are bigger issues than what product to get for database management. How many people does an IC need in order to field questions from 5000 users? Are they going to add many users? What training materials are needed? What kind of support are they getting from the vendors?"

In anticipation of these requirements, Information Builders has taken action. "We've just initiated a site coordinator program," Mr. Wszolek reported. "We'll say, 'If you'll appoint someone in your company to be the focal point of all FOCUS questions, and that's the only person who will talk to our help-lines and hotlines, then we in turn will give this person special training' -- seminars and other things which we don't do for companies that don't sign up on this special program."

"As vendors do that, then a company will turn around and if they have both FOCUS and SAS, they're going to say to SAS, this is what Information Builders will do for me, I'd like to see the same thing from you. It's very much of a growth market."

SAS Institute. Speaking of SAS, as Mr. Wszolek was, that developer of operating and applications software sees the Information Center as a direct outlet for their product. Farrell Drewry, Manager of Marketing Support, likened the IC, with its varied responsibilities, to a "chameleon."

"I see them as three things, depending on where they are," said Mr. Drewry. "In-house consultants, certainly; trainers, very often; and I see them as computer stores, distributing software for pc's. Information Centers are the test bed.

"Yes, it's definitely a market segment for our products," said Mr. Drewry. "We certainly have ads that target the IC group. Separate from MIS? Yes and no. In a lot of cases separate in the kinds of things they do, but, ultimately, management for MIS and IC is probably one and the same person.

"We target some things for Information Centers. We have some promotional literature directed to the IC. I'm not sure how to measure the market -- perhaps as much as fifty per cent of our product. Our products are very popular, at least as far as mainframe software goes in the Information Center. Of course we consider it important to the company."

To reach the market, SAS advertises on two tracks. "We use magazines such as Computerworld, Information Center, Software News. For the pc market we use PC Week and Datamation. We use a separate group for the digital market -- the minicomputer market: Digital Review, DEC Professional, Information Week. We do direct mailings to existing customers to generate interest in additional products. The copy and information in the ads are slanted to IC managers, but they would be of interest to anyone in data processing.

"The key themes in advertising to the IC market are ease of use and flexibility," Mr. Drewry explained. "That's also true of advertising to DP, but we also talk about how the software has the extra power to do what DP might need. We emphasize things like computer performance, which IC managers don't care about but DP managers do -- features like quick applications development."

And does SAS advertising make claims for user-friendliness? "Ease of use is subjective," Mr. Drewry pointed out. "For some products that are easy to use, there's a lot of behind-the-scenes technical overhead that has to be done, whether it's DP or the IC manager who has to do it: set up the file, the dictionaries, things like that. While it may be easy for the end-user, it's not easy for the people charged with doing the set-up."

Behind SAS advertising is an awareness of the conflict, past and potential, between DP departments and end-user assistance programs. "In their role as trainers and consultants, many IC managers have to be very careful not to step on DP's toes," Mr. Drewry said. "In some cases there's a real sensitivity to whether they are consulting or designing applications for the user. Usually if IC people can do anything, the authority is from a higher source, but if they are restricted, that often comes from DP. The perception is, DP didn't do their job, so the IC was created. If I were a DP manager or a programming manager, I'd be sensitive and say, 'These end-users keep asking for things we can't do.'"

SAS sees a need for products that reduce the demand on InfoCenter services. "IC managers are doing in-house consulting, so they need software that maybe doesn't require as much in-house consulting . . . software that users can understand," said Mr. Drewry. "They also need training on specific software. We have computer-based training built into our software. Internally, we have CBT to teach people on how to use our own Data Center. Information Centers need to reach large numbers of people in their companies. I think CBT is a way to do that."

CRWTH Computer Courseware. The SAS endorsement of computer-based training comes as good news but no surprise to Marsha Seidman, president of a California-based firm that has put all of its eggs into the Information Center basket. "My entire product line is IC-specific, the whole thing," Ms. Seidman said with characteristic enthusiasm. "The best person I could sell it to is an IC manager.

"The Information Center gets the benefits of my product line," Ms. Seidman pointed out. "The DP does not. The Information Center manager gets the benefits because his mission is to have end-users independent, to have them do their own computing independently of the data processing department: create their own files, spin a file, have their own files to manipulate the data. In order for the end-users to get to that level of independence they have to be trained properly, and that is where the Information Center manager is my target."

But the Information Center manager is not necessarily easy to find or to target with marketing material. "Sometimes he doesn't exist," said Ms. Seidman. "Sometimes he does exist, but training responsibilities have been off-loaded to the DP training department. I've seen end-user computing going on without the actual structured Information Center, and the end-user departments are all doing their thing. I have pitched through the end-user's environment, and every time I have done that I have made the sale, because that's really the ultimate goal there -- the real mission is to get those end-users independent, whether there's an Information Center or there isn't."

And if there is, the Information Center has a great deal else to do beyond training. "He has on seven million hats," Ms. Seidman explained. "He's starting up an organization, like an entrepreneur starting up a company. It's really a company within a company. When I was starting up my company I didn't have the time to speak to every vendor that would benefit me, and neither do they. So it's hard sometimes to get their attention in terms of being able to see your product."

Although training quickly becomes a very high priority to a newly-formed IC, the need for courseware is not immediately apparent. "It depends on the stage," Ms. Seidman reports. "A very young Information Center doesn't even realize it needs my product line. Training is a big issue when they go beyond pilot -- beyond start-up -- when they become a mature Center. There's also a large need for training when they bring in a new hardware or software. Everybody has to learn.

"As an Information Center matures, end-users out there are saying they need more equipment, more and more computer power. All of a sudden you're talking megabucks. And we have completely forgotten two other places to market to. One is the DP department. Quite often, in half of the Information Centers, there's a political argument going on between the DP and the InfoCenter. The DP department views it as sales helping the end-user, somebody that is doing a better job and is getting better exposure, and DP feels threatened by it.

"Another area is top management. We have forgotten completely that there's a CEO. He has to pay. What is his concern? The bottom line. We do not have good techniques to show people how to measure the benefits of an Information Center. I would love to see a way to market successfully to the data processing manager, the MIS director and the CEO. I know a company that has dissolved an ongoing Information Center, because it was costing too much money and nobody realized the benefits. Nobody sold it to the guy who had to pay the bill. The ability to communicate is essential to the IC."

Lotus Development Corp. The makers and marketers of Lotus 1-2-3, of Symphony, and of Jazz hold the patents on the most popular set of spreadsheet and DBMS softwares in use today. Marty Fahey, their manager of corporate programs, put the conflict between end-user computing and data processing into more technical terms. "They have different needs, so maybe there's some segmentation there," said Mr. Fahey. "The InfoCenter groups are into support, training, and consulting. In terms of our products they're into short-to-medium range solutions to problems. In MIS, they're dealing more with systems decisions and long-term strategies and how micro's fit into the plan."

"We see the InfoCenter becoming the prime support group for microcomputer products in a corporation," Mr. Fahey explained. "In that role some of them choose to be in-house consultants and actually help develop applications or templates for our products, and often they do coordinate the training out of their support center. We see that role as dramatically growing. It used to be that the microcomputer software market was very end-user driven, and now companies are much more aware of standards, compatability, training, and the real people cost of using software."

Does that mean that end-users no longer make decisions for themselves, that Information Centers have assumed that role entirely? "In microcomputer software the costs are usually low to where it's generally an end-user decision to buy," Mr. Fahey responded. "The InfoCenter is more of a consultant. Although we do see cases where ICs actually buy and charge back to end-users and handle the whole procurement process. The IC has more influence in software decisions than in hardware decisions, which are generally more of a company-wide decision."

But if end-users make the "small" decisions and MIS makes the "large" ones, where does the Information Center fit in as a market segment for vendors?

"That's a tough one to answer -- it varies by company. Some IC's are very close to the DP, some are more independent. Both groups are important to us, and we cover both bases."

Then the InfoCenter does indeed have a separate identity in marketing terms. "Yes, especially with our products like the mainframe/micro communications," Mr. Fahey agreed. "We use mostly trade press -- Computerworld, for example -- and business press like The Wall Street Journal. We also do direct mail.

"When we create materials for the IC, it's more in terms of the support programs and how we can help them support thier users. As far as strict sales material -- there are things to market to corporations, and there are things to market to end-users. We'd group IC's into how we market to corporations. You talk less about functions and features and more about systems, like downloading information and keeping them away from having to re-key information, and tools that help them better support their user."

And in these efforts, Lotus worries less than most about the "credibility gap." "I don't think there is one," said Mr. Fahey. "You know, we always sell the benefits of our products, but I don't think it's any worse than the way people advertise products in general. You always look at the good side and bring out the highlights."

Today's major needs for the Information Center? "Better support from vendors to help them support their end-users," said Mr. Fahey. "They need things like high-quality technical support that's different from the masses. The industry hasn't been good yet about differentiating their customers who need a higher level of support.

"They also need to know when new upgrades are coming out -- or changes. They need to know before it gets advertised or out to the user, so that they can be prepared to handle it. I think vendors need to give them better information and realize the leverage role they take in a corporation."

Microsoft Corporation. The developers of MS/DOS and a host of additional softwares for home and business share Lotus' awareness of an Information Center's "leverage" in an organization. "They're influential in the purchasing decisions made for software, and becoming more and more influential," said Jerry Ruttenbur, Microsoft's vice president for retail sales, whose product line includes Multiplan spreadsheet software. "I think there's less influence in hardware, but definite influence in software and peripherals. There's definitely more influence in micro's -- less so in mini's and mainframes. In terms of purchasing authority of their own, I think that's minimal. It depends on which corporation you're talking about, and how they're structured.

"We haven't done a lot in targeting our marketing or sales efforts to this particular segment. We've seen the Information Center as an important part of the after-sales -- more so than upfront sales -- in that following up with them on product knowledge and information will insure that we end up getting satisfied users that we believe will be good for additional sales. However, we will place more emphasis on the upfront in the future."

For all this awareness of the InfoCenter's growing influence, Microsoft has yet to tailor its advertising directly to the IC. "Maybe we should," Mr. Ruttenbur confessed. "We use business publications --

mostly the Journal, Business Week -- and also Info World, all the 'techie' books which a lot of the IC people read. We may not be segmenting the advertising, but we're reaching them in other ways."

With what product for their current needs? "We believe strongly that they'll need to move to the graphical-user interface products, the windowing," said Mr. Ruttenbur, referring to Microsoft's WINDOWS, a newly introduced multi-purpose software. "It's going to take a big burden off them. It's going to result in greater productivity because users will be able to get up to speed faster on the products and, more importantly, be able to exchange data faster back and forth from various applications and get much greater productivity out of their products -- and do it quickly and easily.

"We have made very few statements regarding ease of use," Mr. Ruttenbur said about past Microsoft products. "We've pulled away from that kind of thing. We talk about the products, what they're used for, now they benefit the user, and we're careful about making statements that create unrealistic expectations. We do do that on the Macintosh products, because we believe they are easier to use. We also make those kinds of statements about WINDOWS because that's the whole concept behind windowing -- the graphical user interface which does make the product easier to use. So we are not making any false statements."

Microsoft continues to believe that the after-sale contact with Information Centers is vital. "I think they need good support from the software publisher in terms of training and training materials, and they need information on product enhancements -- what kinds of upgrades are available for particular products and what are the new features that are coming," said Mr. Ruttenbur. "Also, they need to be trained, and they need to know what training is available to them, the materials available to them, and the information on upgrades and future products. We're putting a large investment in this --- for two years now. We believe this is the key to long-term success."

Ashton-Tate. The West Coast developer of DBASE-II and DBASE-III database management software sees a merger occurring between the Information Center and the MIS/DP structure, due to the convergence of hardware requirements. "We're beginning to see some movement to bring those two groups together as the separation between microcomputers and mini's and mainframes gets fuzzier," said Lydia Dobbins, director of integrated and word processing products. "Over time I'll expect they'd have to work together in a more direct fashion."

The thumbnail sketch Ms. Dobbins draws of InfoCenter evolution differs from most others in that she sees end-users themselves as a definite force in their development. "As microcomputer usage mushrooms in large companies, eventually some group of microcomputer users joins together and either somebody gets promoted into a staff position to actually provide support, or there's a committee that people serve on in addition to some other task," her version runs. "Finally, on behalf of all the corporate end-users, someone is providing customer service and reviews of products as they come out, and putting together a list of approved products or very specific standards within companies."

Like Microsoft, Ashton-Tate deals directly with Information Centers to support purchased products rather than to sell new ones. "We have a corporate emphasis support program which targets the IC manager or micro manager," said Ms. Dobbins. "We provide access. Although they may not want to buy from us directly, they want to know that they can contact us directly for information." Thus, Ashton-Tate serves the IC as a specific user segment, without selling or advertising to it as a specific market segment. "We're seeing more and more that the user departments are actually doing the buying, at least on the micro level, and that the Information Center acts as the funnel for a kind of 'Good Housekeeping' seal. After the fact they're involved in support."

Because of that support relationship to the product, Ashton-Tate's salespeople do call on Information Center staffs. "Not for direct selling," Ms. Dobbins explained, "but to help create awareness about our product line. When we ship new products, we put together evaluation kits for the members of our corporate emphasis support program, who are typically Information Center people. Those kits differ slightly from the materials we send to our dealers. The kits are product specific, and include an evaluation copy of a product. They also contain some printed literature about the product, and a sampler, which is a crippled version of the product that can be distributed freely for review purposes."

Like others in the field, Ms. Dobbins sees reform in the nature of the claims that are made in sales materials and advertising. "Very few of the ads I see today talk about getting a computer and using it in fifteen minutes. That was the tone in the early days. Some of that tone was from the hardware people who had a bigger job in overcoming the fear of using a personal computer for the first time. There have been some instances where software manufacturers have done it --- but not today. I think most of the advertising speaks in a very feature-intensive way and throws in easy to use as a standard claim. In our work with groups of end-users most of them say they don't believe it whether they're currently using the product or about to use it. Everybody claims it, and end-users don't know if they really deliver.

"Ease of use has played an important role in our advertising, but it's never been the lead theme or primary selling point. I think it's a necessary evil. To not say it's easy to use makes people think you really must be hard. It's a standard that needs to be addressed in some way. It gets tougher and tougher to say it in terms that the end-user will believe and that the products can deliver upon."

Responding to our question about the Information Center's current needs, Ms. Dobbins did not answer in terms of product. Instead, she placed today's Information Center in the spot formerly held by data processing departments. "Control," she said. "The IC manager is a whole lot like the MIS guy was several years ago. The IC is going to try to do anything now to bring in the rebels. It will be tough. A little bit of power has gone a long way in liberating computer users.

"Beyond that, his big need is to know where the market is going -- where software and hardware vendors are going -- to help manage and control the growth and adoption of pc's into the company."

3

AUTHORIZATIONS:
SIGNING ON THE DOTTED LINE

Evaluations are one thing, approvals another. In the first instance the Information Center offers its informed opinion, in the second its signature on a purchase order. This is where power becomes an issue of the first rank, and more than half our respondent Centers wield such power. To the question, "Must the Information Center approve the purchase of end-user computing tools?", a clear majority of the AMA sample answered "yes."

But there is more to authorize than spending, more power at stake than that of the purse. Information Centers have a large say in who may use micro's or mainframe terminals, how and when the two may be linked, and whether data can ride down or up the connecting wires. InfoCenters act as corporate monitors, protecting and disbursing data.

Naturally, authority is greater touching on microcomputer technology, as the Information Center's business tilts evermore towards micro's. For every two microcomputers that Information Centers served in 1985, there'll be three in 1986. Our respondents plan a 44 per cent increase in the installed micro base this year, but only a slight rise in mainframe terminals.

The ability to link these newly-acquired machines to a mainframe or minicomputer lies behind the increase. Heretofore, a majority of end-users worked at mainframe terminals, the better to access figures from the corporate database. Now technology allows downloading the data from the mainframe and massaging it with user-friendly programs designed for the pc. The result: linked microcomputers will double from 1985 to 1986, and the total number of micro's for end-users will outnumber terminals by a ratio of five to three.

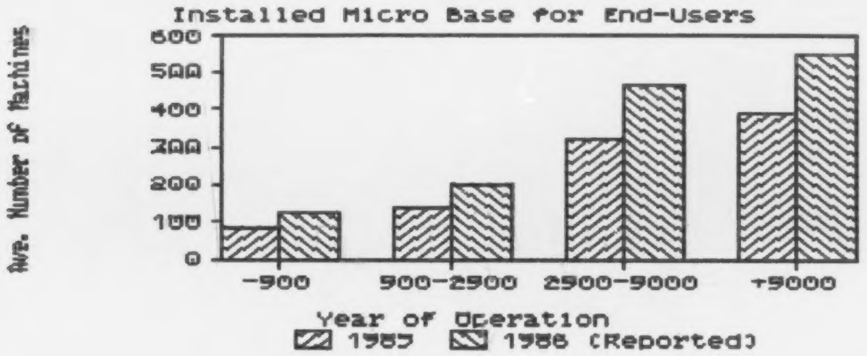


FIGURE 16. There'll Be Almost Half Again As Many Micro's For End-Users By The End of 1986 . . .

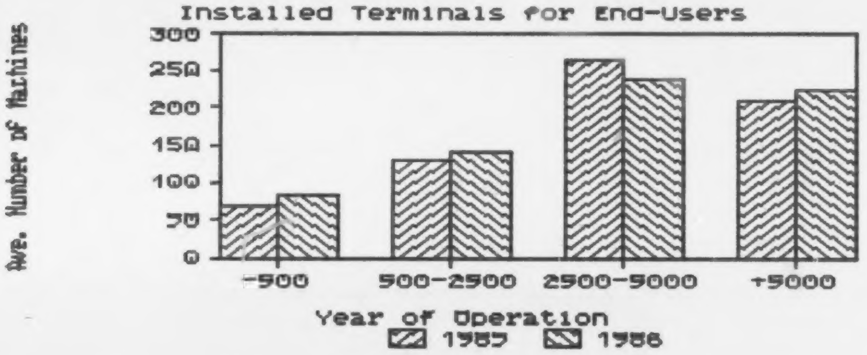


FIGURE 17. While Mainframe and Minicomputer Terminals For End-Users Increase Slightly or Actually Decline . . .

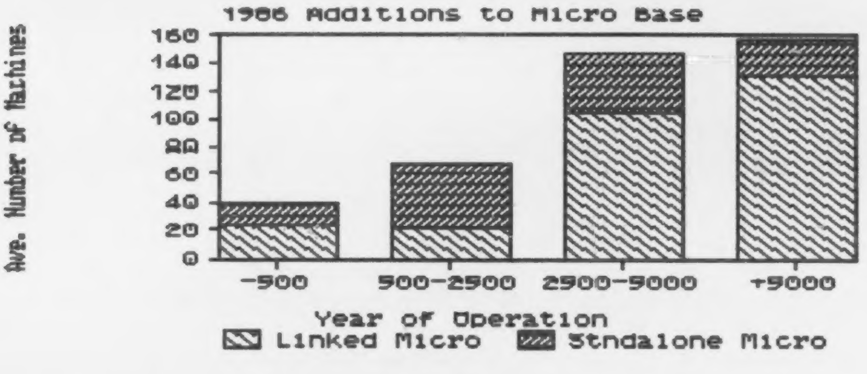


FIGURE 18. As the Majority of Newly-Installed Micro's for End-Users Are Linked To a Mainframe or Mini

Cost differentials are shrinking, too. The current price of an installed terminal, guided entirely by mainframe software, ranges from $600 to $800 -- about one-fourth as much as an IBM PC with screen, printer and software. The IBM "clones" that reached the market in 1985 drove down that spread considerably.

As a result, few companies will install additional terminals for end-users in 1986. The same InfoCenter managers who approve all those micro's and link them to mainframes will increase their installed base of terminals by a tiny 4.6 per cent.

How much hardware is at issue? By itself, the AMA sample of 529 Centers will increase its installed base of microcomputers by 37,000 units in 1986, with the intention of linking more than half of them to a mainframe or mini. By business classification, banking and financial firms and insurance companies will be the biggest buyers, upping their installed end-user micro bases by 56.9 and 57.9 per cent respectively. Utilities match the average for the whole sample, increasing their micro base by 43.8 per cent. Manufacturers trail here, but will still increase their number of end-user micro's by more than a third, and intend to link 70 per cent of them to a larger unit.

Few Information Centers make such spending decisions alone; by the same token, few such decisions are made without its input and approval. By company policy, three-quarters of our respondents must be consulted before any end-user hardware is bought; software purchases, a lesser expense, require InfoCenter consideration in 69.4 per cent of respondent organizations. Consultation, of course, is not the same as approval.

That said, about two-thirds of all Information Centers have to sign the purchase requisition before microcomputer hardware or software may be bought. They have less authority concerning mainframe software purchases, still less touching on mainframe hardware: generally, fewer than one-third of respondent Centers must sign off on mainframe expenditures. Those generalizations hold across lines of organizational size or business activity, although the exact numbers shift about.

What other signatures are required? Very few Information Centers operate entirely outside of an organization's MIS/DP set-up; indeed, it is the role of the InfoCenter to link MIS/DP with end-user departments so that the entire company may distribute and deal with information

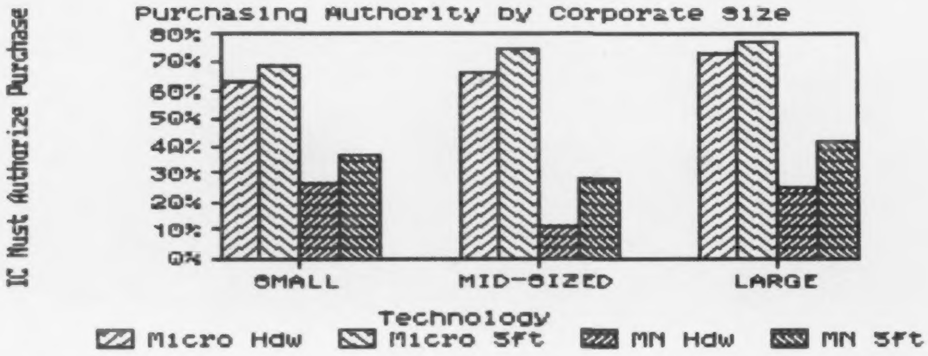


FIGURE 19. Most InfoCenters Must Approve Purchases of Micro Technology; Only A Third Have A Say in Mainframe Purchases.

more successfully. Any major expenditure on computing tools -- a mainframe or minicomputer, operational or applications software, a local area network's requisite wires, bells and whistles -- requires the approval of a senior DP manager or MIS director. At the other end of the scale, the InfoCenter cannot watch over the fall of every sparrow or the purchase of every software package even if company policy requires it to do so.

Access and Linkage. Hand in hand with the authority to sign a purchase requisition is the power to approve the very use of the technology. Here again, the InfoCenter plays a far greater role where microcomputers are concerned. Only a third of the AMA sample must approve

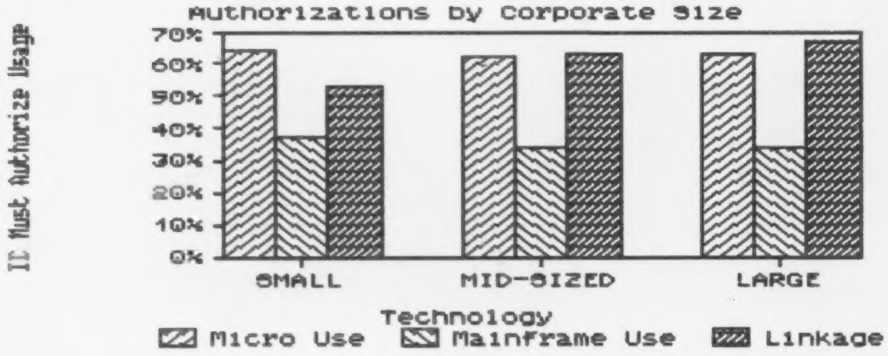


FIGURE 20. End-User Access to Both Micro Technology and Corporate Data is Controlled and Monitored by the InfoCenter

end-user access to mainframe terminals, but nearly twice as many -- 62.9 per cent -- must authorize the use of micro's. IC's have an equally important say in the matter of data transfers: 62.6 per cent must approve micro-to-mainframe links.

"Connectivity" is not simply a technical problem. It is a political issue as well. Decisions must be made about access to corporate data. In organizations large and small, the InfoCenter stands at the pivot of the information system, coordinating those decisions, acting as mediator where the "need to know" is matched against the exigencies of corporate security, or balancing what an end-user wants against its cost to the company.

These are not theoretical cases. Put yourself in the place of this InfoCenter manager, who works at the corporate headquarters of a Fortune 500 company:

> "I support several divisions. Only one has gone strong in the direction of end-user computing. Another division is very gunshy. Requests come from whoever has a need for access to the system, or to be in the data flow. A lot of people simply want electronic mail. These are the people that are driving up the volume.
>
> "Our standard product, the IBM 3270, costs eight thousand dollars. The approval goes through a division director, his vice president, and his vice president. A $1,000 dumb terminal doesn't have to go through a vice president, so a lot of people are buying dumb terminals that won't support their needs down the road."

The manager is dealing with the multiple problems of suiting the technology to the need, judging its cost-effectiveness, and procuring not just his own signature but also those of several others on up the line. He adds, "We're trying to get people to come to us for consultation, but there's no required procedure."

Justification Policies. The favored "required procedure" is a written justification form, and two-thirds of our respondents insist upon one before end-user hardware may be purchased and installed. More than half the sample requires such a form for software purchases as well. The policy is applied with remarkable consistency across lines of company size or worksite description. Small companies (61.2 per cent)

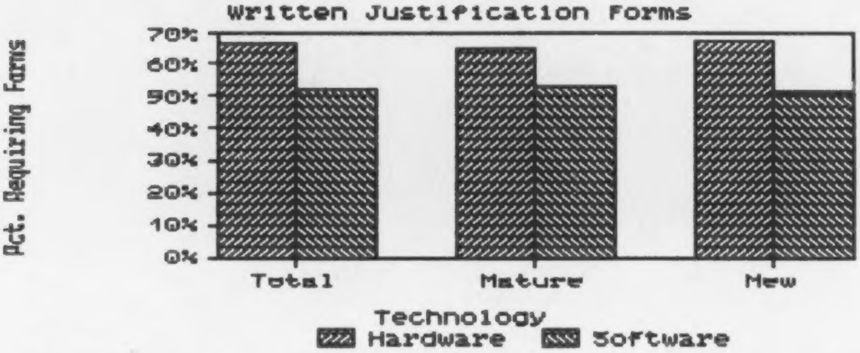


FIGURE 21. Written Justification Forms Are the Rule When End-Users Request Hardware or Software Through an InfoCenter

are almost as insistent on written justifications for hardware as large ones (67.9 per cent), and the margins are even closer for software purchases -- 54.1 per cent of small firms, 54.8 per cent of large ones.

"Where's My Micro?" Justification is one things, rejustification quite another. Measuring the actual worth of end-user computing -- the time and money saved when people have access to corporate data and may work with it on their own machines -- is the subject of the essay that follows. Before considering that, let us first deal with a purely bureaucratic question. How long dies it take an InfoCenter to field a routine request for a microcomputer, assuming a routine justification?

About six and a half weeks from time of request to installation, according to our respondents. You'll get it a week quicker if you work at corporate headquarters, but if you're in a division or subsidiary the wait-time stretches to eight weeks.

Theoretically, smaller firms have less bureaucracy, and thus a shorter wait-time. Not so, in our sample. Managers in small firms will wait eight weeks. In contrast, billion-dollar companies have a five-week wait. At the extremes, 20 per cent of the sample reports a mere two-week wait, while three per cent would need more than 20 weeks.

And in some locations the wait would be endless. There are mainframe shops that "wouldn't allow those @#$%(+&*! things in my company," to quote one comment in the margin of the AMA questionnaire. Another said that the inquiry was "prejudicial." Apologies to the offended.

CLOSE-UP

Do Keystrokes Count? The Problem of Productivity Measurement

There is an irony, delicious to some, distressing to others: computers, which reduce all things to numbers, cannot easily generate numbers to prove their own worth.

One East Coast government agency reduces the measure to its most elemental level. "We count keystrokes," says the IC manager proudly. "Every month I get a computer readout of the number of keystrokes entered by each end-user. We match that against their assigned quota, and if they fall below that quota, they go on probation. If they don't get off probation in three months, we take away their computer."

Granted, there may be business uses for desktops where productivity can be measured in keystrokes. But this would not suffice for most InfoCenter managers. At the other end of the scale is an argument that might be called the "telephone metaphor." The tool -- be it telephone or computer -- is not provided for constant or even frequent use. But there are times when it is an absolute necessity, and that's why the worker has it.

Many of our respondents see the tool analogy as central: easing the task, making more effective decisions, better reporting, better (or faster) customer service, and quality of work weigh more heavily than productivity. Back when automation was a new idea, justification was easy. Argues Sharon Meng of CICA, "In the old days, ten or twenty years ago, computers addressed clerical tasks. We could do a mass production of policies or claim payments -- the repetitive kind of work. You could quantify the benefits because the computers reduced head count. Now, micros are geared toward professional staff rather than the clerical, and the benefits are not so tangible."

For others, justification is possible, no matter how sophisticated the application, and these respondents continue to prod the desktops until they do yield numbers that justify their existence. Many of these techniques are innovative and, for the InfoCenter managers who use them, quite satisfying.

To investigate this area, our researchers conducted approximately fifty interviews with InfoCenter managers who had returned questionnaires. The interview opened with a provocative scenario, a dreaded "moment of truth" for anyone responsible for justifying micro's:

> "Imagine that a senior corporate officer walks into your office and puts this issue on the line: 'Last year, this company spent half a million on hardware and software in support of this so-called "end-user computing." Now, prove to me that the investment is paying off. Show me, in dollars and cents, that the money was well spent.'"

The interviewer continued by asking if it would be part of the InfoCenter manager's job to field this question. If not, why not? If so, what measurements would be used? The researcher went on to probe for techniques used at the respondent's company to gauge productivity, regardless of who was responsible.

The respondents' answers were as varied as their situations: the size of the operation and the user community supported, the IC's age and stage of maturity, the kind of work to which micro's and terminals were put, and the like. Generally, InfoCenter managers responded in one of four ways:

- o "It's not my job. Justification is a department or work-group responsibility."
- o "Justification is a shared responsibility between the InfoCenter and the end-user."
- o "The InfoCenter is fully responsibile for proving the computer's worth."
- o "Justification isn't an issue here."

The arguments for all four approaches are equally compelling.

"They Run Their Shop, I Run Mine". The senior technical specialist for a nationwide retailer chain put it this way: "It's not my job to help end-users justify their machines. It's my job to help them use the machines once they get 'em. I can't force them to be more productive. Look -- they could keep turning those machines on and off for all I care."

An InfoCenter manager for the U.S. Coast Guard agrees. "In our organization, when a manager puts in a request to purchase a computer, he has to do a cost-benefit analysis first. We can advise him on how he's going to use that machine and what benefits he can expect from it. But once he gets it, he assumes the responsibility for achieving those benefits.

The InfoCenter manager for a midwestern consumer goods manufacturer put it simply: "It's their machine, their budget, their job."

The respondents in this camp often cited charge-back policy as the hinge for swinging justification back in the user's hands. The department or division manager had approved the installation, and that department or division was paying for it. The IC manager, acting as technology consultant, had no business telling a profit center manager how to run his or her shop. The supervisor for a user-support Center at a southwestern utility company elaborated: "It's a major portion of each manager's annual budget process to budget dollars for end-user computing. They pay for their terminals and their line time and their printers and plotters -- for their software and for the time spent to teach people programming. And they're held accountable when they go in for the budget review."

(Note: Approximately half the InfoCenters surveyed for the 1985 report have chargeback policies for hardware purchases. Such policies are slightly more common in larger firms than in smaller ones, about 40 per cent of which have chargebacks. About the same percentages have chargebacks for software purchases. One Center in three also charged for installation, hookup, and interface costs, and one out of four billed user departments for data storage costs, time connected to the mainframe, and maintenance and repair. Some also charged for overhead and consultation time.)

Like the respondent from the Coast Guard, many of the managers cited a detailed initial justification policy (or pre-installation cost-benefit analysis) as making all the difference in the world. Rejustification procedures are annual events at the Nebraska headquarters of Mutual of Omaha. And just as the Information Center was helpful in designing the original justification, they also aid the end-user in the yearly review. The InfoCenter manager from a Fortune 500 electronics manufacturer agrees: "We can't authorize any purchases of end-user equipment until we have an objective measure of its effectiveness. The hard work, then, is up-front -- determining what the measure is. Once the equipment is in place, it's easy to evaluate performance."

One For the Books. One automobile manufacturer (a U.S-Japanese co-venture) gives each potential end-user what the IC manager calls "a whole booklet of forms." One of these asks for a narrative of how the machines will be used, then directs the potential user to estimate the number of hours to be saved, on a monthly basis, in each of four employee categories: clerical staff, managerial staff, analytical-support staff, and contracted services. The IC manager then assigns a dollar figure to each category by multiplying hours saved by salary per hour. He then projects to an annual basis, minus time spent during the first three months. (The first three months are considered as a "learning curve," with few real gains in time savings.) Thus, the machine must pay for itself in a nine-month period.

"It's worked out well," states the respondent. "We don't have any micro's that aren't being used." Does the procedure inhibit acquisition? Apparently not. The Center started in 1985 with approximately 50 standalones, 5 linked micro's, and no terminals. The current user base of 250 has access to 15 standalones, 125 linked micro's, and 20 terminals. By this time next year, the number of linked micro's and users will have doubled, and 50 terminals serving an additional 100 individuals will be in place. The sales and marketing functions account for about 40 per cent of the InfoCenter's requests. It takes the Center six weeks to have a machine in place, given a routine justification.

In a more bureaucratic vein, one public agency asks each potential end-user to read and fill out a forty-page manual entitled, "Office Automation Benefits and Procedures Guide." Using standard formulas, the user computes per centages and dollar figures predicting the benefits his computer will yield. After installation, the InfoCenter manager goes back and compares how the actual, realized benefits stand up to the original estimates.

Other respondents conduct more casual before-and-after studies, asking such questions as, "Is the work really getting done any faster? Is the work of better quality?"

You Call the Shots. Patricia Sadar, senior systems analyst for National City Bank, argues that yes, the end-user is ultimately responsible for justifying the purchase. But the IC manager should lend a helping hand. Says Sadar, "The IC manager can show end-users certain techniques in how to justify machinery. We also try to make senior managers more receptive when justification time rolls around."

The utility company manager quoted earlier put it this way: "The InfoCenter manager has a clear responsibility to provide management with a reporting of the IC's services and its capabilities -- and of who is using those services." His Center puts out a monthly chargeback report, detailing usage patterns by department and by individuals within departments. The report shows time spent on the communication lines, time logged on the mainframe, new equipment charged to the department, changes in equipment, storage space consumed, and the like. The Center also provides statistics on the number of people trained by each department and on which products these people were trained.

Quantitative Measurements Cited by Respondents

- Cost of application development, as estimated by MIS, against actual costs for IC/user-developed application.
- Number of persons trained by department or by product.
- Number of user-developed applications.
- Number of requests for help after training (as an indication that the product is put to use).
- Staff reductions, measured over a period of time (two years or longer).
- No staff increases in user department in spite of increased workload.
- CPU time by application and by user, with follow-up evaluation.
- Before-and-after studies, based on quantifiable criteria set at implementation.

The system gives managers a view of how their departments are doing in relation to other departments, according to the respondent. "Some of the managers say, 'Hey, we're not a bunch of programmers. Why should we have so many people with capability in the same product?' Others say, 'Hey, we're falling behind in technology. Why aren't more of my people using the system?'"

"If I Recommend It, I'm Accountable". On the other side of the coin, there are those respondents who believe that computers are good for business and that InfoCenters should be their strongest defenders. "I found that the machines more than pay for themselves," says the micro coordinator for a New York gas and electric company. "Most people tend to look at computers myopically: they may bring in one to do spreadsheets, but instead it's the answer to their dreams. They discover it can do things they never even thought of before."

The user-support section manager for a leading manufacturer of cameras and photograhic equipment puts it succinctly: "Those who recommend the technology should be held accountable."

Interestingly, even those who do homage to the IC's justification responsibility have trouble coming up with hard numbers. In general, IC managers tend to rely on soft measures, such as end-user surveys, interviews, or case studies of individual applications. Many talk more easily about "quality of output" rather than quantity. And when hard numbers are forthcoming, they often stem from the type of pre-justification work cited previously.

Most would agree that the soft measures would be unlikely to convince the CEO. For those companies facing reductions in staff, the question is even more critical. Such was the case for several of our respondents, whose companies were in "dire straits" and who found themselves attempting, with great frustration, to justify their own existence. "We've asked people to keep logs showing how they've used the tools and how much time they've saved," stated one respondent, from a midwestern communications company. "But this doesn't work. They tell us things like, 'We've saved a lot of time' and 'We couldn't live without it,' but they can't give us anything hard and fast."

Sharon Meng, micro director for CICA, agrees that end-users are unreliable when it comes to assessing their own productivity. "They'll say they use it eight hours a day, but that's not true. It's very difficult to do a survey in a straightforward manner. Sometimes they don't even know how the computer is helping them.

"There's a difference between the number of hours spent at the computer and the applications developed. A user might be on his micro only a hour a week, but the application he developed might justify that hour. Another user might be on his machine for forty hours a week, but his application might be pure gloss, with no substance behind it."

Other respondents challenged whether time savings really mattered. According to one respondent, giving a computer to a clerical worker would be a waste of time. "The clerical person may save time, but he or she will just spend that time reading a book."

The Bottom Line: Any Answers? Finally, our interviewers put the IC managers on the spot, asking them to answer the CEO's question with any hard and fast justifications they could think of. Again, respondents fell into four camps: (1) those who talked primarily about intangible benefits, such as better information, better service, more power in decision making, and better quality; (2) those who answered with isolated examples; (3) those who cited ongoing measures; and (4) those to whom justification was not an issue.

(1) Quality and effectiveness count. "We're leading executives down a primrose path by harping on the productivity issue," states an IC manager from an auto manufacturer. Others agree, especially when it comes to assignments from the top of the company.

"When I introduced graphics to the senior management team, I said, 'Hey, with this now even you guys will be able to understand the numbers.' No wonder I haven't been promoted!" The respondent went on to say that he could measure his effectivness by the number of graphics coming out of the head office. "When you're talking about senior management presentations, boardroom decisions, and contact with key clients, you gotta put the quality issue up front."

A respondent from a not-for-profit foundation talked about her public education function, a key area for the organization. "These people can go into the network and find out what others in the department have already done on a subject, and draw on that work. The reports are more thorough, and better researched and documented as a result."

"Ease of task accomplishment" was another frequent theme. Many respondents measured effectiveness by the decrease in hassles and headaches needed to do a job.

(2) Isolated examples. Even when productivity measures may be spongy, there are islands in the sea. Here are some examples:

> "One man in our company requested a 3270 so that he could connect more quickly between systems. He figured he saved at least half an hour each day just in logging on-and-off time. He then computed the time he saved since he got the computer and multiplied that by his hourly wage. Based on that, the computer paid for itself in a year." -- Micro Coordinator, East Coast utility.

> "Our plant system verifies electric and utility bills. We've found cases of overcharging, and these alone have paid for the system." -- Manager, InfoCenter, Midwestern university.

> "One of our vice presidents came into my office the other day to tell me that our support had been one of the keys in helping the firm in an acquisition deal. You know -- that kind of thank-you is all the justification I need. And it's not an isolated example." -- Computer Support Manager, *Fortune* 500 consumer products manufacturer.

The InfoCenter manager at a national retailer cited an instance where the computer saved the company $250,000 by enabling it to keep valuable information when an insurance subsidiary was sold off. One other example came from James Rudman, assistant director of administrative systems at Vanderbilt University, who described how the computerization of the telephone directory saved an excess of $25,000. The savings were calculated based on the time the operators previously took to look up numbers and the salary that would have been required for an auxiliary person. Rudman's efforts earned the university a cost-reduction award of the National Association of College and University Business Officers (NACUBO), which gives an annual award to the college or university that achieves the greatest savings through its computers.

One InfoCenter manager collects "atta-boy stories," cases in which the computer enabled big cost savings. The most memorable stories are published in the company's newsletter. Another collects stories of innovative applications and circulates these among other users. "We ended up promoting and selling one of our home-grown applications," he says, "and the product has turned a profit."

Others cited instances of savings on development costs for individual applications. "Our financial group asked divisional MIS for for a quote on one particular application. MIS said it would cost $60,000 to build. The group was able to do it themselves for about $2,000," states the manager of Information Center programs at a Florida-based service company.

(3) Ongoing measures. And the anecdotes go on. But -- has anyone found a measurement that is both concrete and applicable, on an ongoing basis, across a range of applications?

Sharman Hart, InfoCenter consultant for Westinghouse Electric Corp., claimed that productivity increased 15 per cent across-the-board since the installation of their computers. She arrived at her figure by measuring the number of assignments that each department was able to handle without increasing staff. Other respondents pointed to staff reductions as one of the best long-term measures. Another respondent, basing his comments on in-house surveys conducted periodically during a two-year period, states that 60 per cent of his users cite either staff reductions or leveling of the workforce in the face of increased assignments as their primary benefit.

Another manager stated that she was running her Center as "a business within a business" as a matter of survival. Part of the business-within-a-business approach is to ask each user to put a dollar benefit value on services purchased from the IC. "We're getting a lot of soft stuff like 'I didn't have to hire another person' or 'I didn't need a temp.' But one person put a value of $90,000 on his system."

Was the $90,000 savings real? "I don't know," replied the respondent. "The user says that the system enables him to track products, their availability, and their price and shipping costs. Apparently being able to do that is worth $90,000."

Barbara Cerio, senior IC analyst for 7-Up/RC Companies, described her method for end-user productivity: "Each time the user goes into a menu, it's counted on a stat sheet. At the end of the month, we tabulate how many times each person has used the computer." Is this suspiciously like the keystroke counter we mentioned at the beginning of this essay? It depends on the way the stats are evaluated. The March of Dimes uses a network to track the amount of usage on data processing, word processing, and database management for each machine. The IC manager is then able to give each department a list of end-users and what they're using the system for. Non-use (or very light use) of a machine can lead to an evaluation, and possible reallocation of equipment.

What if the IC manager is with a major manufacturer of computer hardware and software -- and thus able to acquire the tools at no cost? For one such respondent, through-put is the crux.

> "We have histograms, application by application, on the mainframe. We can relate these to the transaction through-put of a critical application that cannot be off-loaded from the mini. Now we have an overlay and can say that the number of concurrent applications has a distinct effect on the through-put of one application. Therefore, any purchase of software that will remove the load from that computer during those periods will have a substantial effect on productivity in the transaction through-put of the other critical application."

Wait-time -- for through-put, for application development, for a graphic to be ready to use -- becomes the central issue.

(4) Justification is a non-issue. For many of the small companies interviewed, justification just wasn't a pressing concern. A typical response: I've only got ten computers out there, and I know they're all being used."

An IC manager from an East Coast Insurance company sees his ability to maintain a competitive edge over the MIS/DP as obviating the need to justify. "We started out small, and proved to a few functions that we could give them a bigger computer bang for their bucks. We've repeated that performance for almost every application. Nobody's asking me to justify."

Finally, there was the response from the IC manager from a major petroleum products company, who was completely taken aback by our initial scenario. "I can't answer that question! I'm @#$%&*()! Maybe they'll fire me now. That's a question hopefully he [the CEO] will never ask."

4

TRAINING: THE INESCAPABLE ROLE

Only a few years ago, InfoCenter trainers faced the task of teaching a great number of people about some very basic concepts. "We used to put them in a room and say, 'this is a computer,'" as one respondent put it. Although the pace of this "first wave" of training has slackened somewhat, it hasn't signaled the beginning of the end for the InfoCenter training function. These same trainers now face a "second wave" of training requests, more sophisticated than the first, and more central to the organization's business function.

A second wave that breaks before the first has subsided leads to a predictable result: a net increase in the number of training requests per annum. Our 529 InfoCenter respondents were responsible for training nearly a quarter of a million individuals in 1985. In 1986, the number will rise to over 300,000, a striking 24.1 per cent jump in the training load. To cope, respondents will increase every manner of instruction to cover the basics, hoping to free staff talents for higher level training and consultation.

Much of the second wave work cannot be farmed out to contracted firms, because only on-staff personnel are sufficiently familiar with the system architecture and the relationship between application and business demands. Many respondents devoutly wish for such a shift in their training role and would welcome such a trend. Less hand-holding is very much to their liking; a more sophisticated clientele means that they can become more professional and consultative in their work.

But before that dream becomes reality, there remains a huge population that still needs instruction in the basics. To handle the caseload, respondents will rely increasingly on computer-based training, either for self-instruction or as a component in a training system.

Specialists. AMA's 1985 Report found that not all Centers assume training responsibility at start-up; for some, the responsibility comes with maturity. Early or late, the overwhelming majority come to have some role in training. Eight out of ten InfoCenters handle training on micro hardware and software, seven out of ten in the use of mainframe software, and six out of ten in the use of mainframe hardware. Eighty per cent of mature Centers have training responsibility for mainframe software, perhaps because more of these Centers began as mainframe shops. Add up the overlaps in all these categories, and only about five per cent of the Centers end up with no training responsibility.

For all of that, training specialists have been late arrivals on InfoCenter staffs. One of the first people interviewed for our 1985 study -- a highly respected MIS manager and an early champion of personal computing -- speculated whether the new IC would be best headed by an MIS professional who had learned to train, or by a training expert who had become knowledgeable in computers. That speculation now seems prescient in light of actual practice. Only about a third of our respondents started their Centers with any training person on board, but the situation changes rapidly and considerably as the Center matures. By now, half of all InfoCenters will have at least one training specialist on its full-time staff, and by this time next year, about 60 percent of all Centers will have a trainer. Newer Centers lag a step behind, but soon realize the need.

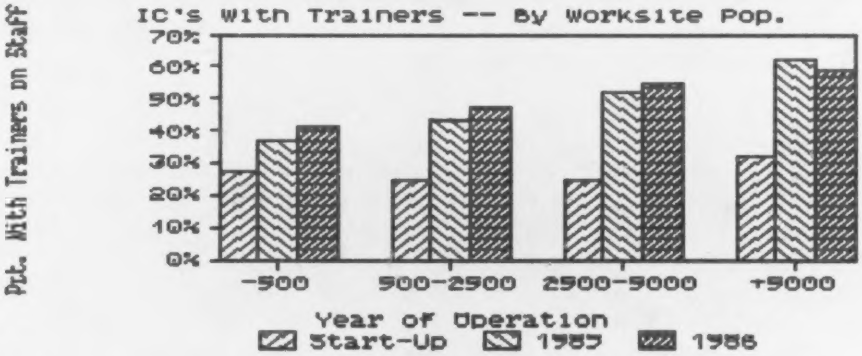


FIGURE 22. By Year's End, Most Information Centers Will Have At Least One Training Specialist on Its Full-Time Staff

One trainer soon leads to another, and staff levels in this segment of the InfoCenter complement are steadily increasing. This is

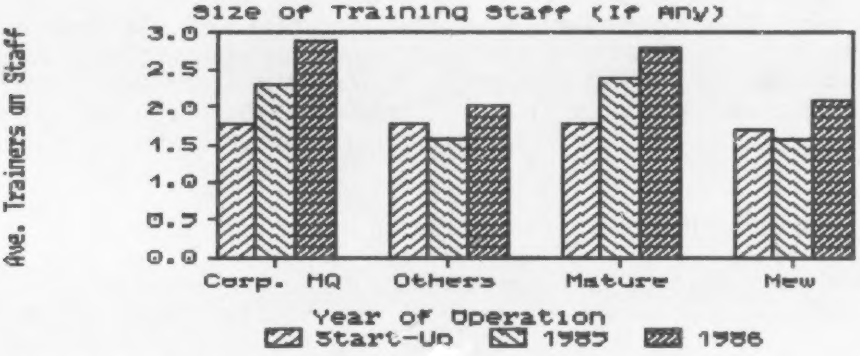


FIGURE 23. One Trainer On Staff Leads To More

especially true at Centers located at corporate headquarters, where IC's first form and set the pattern for divisional and branch offices; similarly, mature Centers lead newer ones in training staffs. The average number of trainers on such staffs is now two, and the level will increase to about three by this time next year. Remember, however, that MIS/DP professionals still dominate. The trainers are -- and will remain -- a minority, albeit a key minority.

A more detailed analysis shows that a corporate headquarters is more likely to employ a larger training complement as part of its Information Center than a subsidiary. Also, company size, measured in terms of annual revenue, correlates directly with the number of InfoCenter trainers, as does the number of employees at the worksite. Put

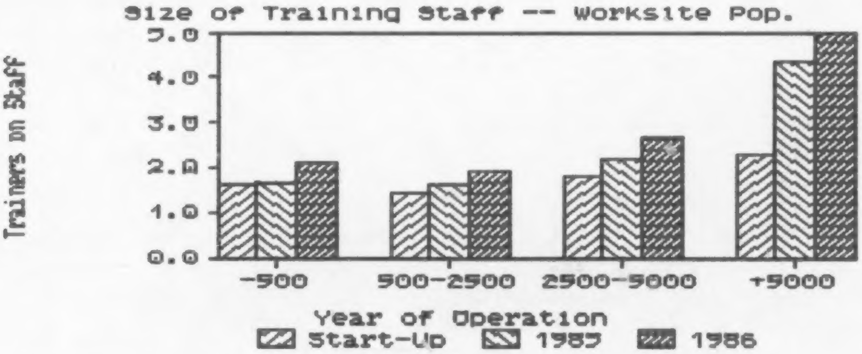


FIGURE 24. Training Staffs Grow Steadily At All Centers

all the correlations together, and the number of trainers increases dramatically: One respondent IC -- the corporate headquarters for a billion-dollar firm with more than 5,000 employees on-site -- carries an IC training complement of thirty. A few others, as well, are carrying impressively large training staffs. About seven per cent of our large-worksite respondents have ten or more trainers on staff.

Does the higher number of trainers translate into better training? Apparently it does, at least as our respondents see things. Recall that another section of the questionnaire asked respondents to rate themselves on their success in meeting the objectives that prompted InfoCenter start-up. Our finding: the larger the training complement, the greater the incidence of high success ratings in the training area.

For large-worksite IC's, the success rating goes to a 4.13 on the 5-point scale, compared with a 3.9 overall. In mature Centers with higher training complements, the success rating climbs to 4.16. In corporate headquarters, it goes to a 4.07.

Understand, of course, that these numbers are subjective, as self-ratings always are. (If you want to know how good the meal was, don't ask the chef, ask the person who ate it.) In most cases, however, the person filling out the questionnaire was the head of the IC, not the trainer, a fact that may give a touch more credibility to the scores.

Contacts and Tools. The 1985 AMA Report noted that Information Centers open the gates for a dramatic increase in the range of training resources and techniques an organization employs. Before a Center is in place, a firm is likely to draw on just a few of these: self-instruction with manuals and cassettes, for example, plus instruction by in-house or contracted trainers. After the Center is up and running it experiments with a variety of means, trying to see which deals best with the enormous training burden. Following that "experimental" phase, options may narrow to those which have proven most effective.

Choices abound. "What kind of training?" is a question that ranges over such factors as:

> Location. Off-site and on-site are the obvious options, but self-instruction may take place at the trainee's home or office, or in the InfoCenter itself at a "host" microcomputer or mainframe terminal.

Additionally, companies with multiple worksites may locate computer training at one location, across town or across state lines; not all "in-house" training takes place at the end-user's worksite.

Provider: In-house staff trainers are not a ready option unless "training-the-trainer" sessions are part of the package. Hardware and software vendors supply such courses, and many train end-users directly; independent firms offer similar training packages.

Method. Stand-up lectures, notebooks and manuals, audio and video cassettes, and tutorial disks for computer-based training may be mixed-and-matched in exponential combination. And to add to the confusion, each may be available from hardware and software vendors or from independents, or tailor-made by in-house staff.

There are wheels within wheels here, and a traffic jam of options when one considers that a single Center may employ a number of methods to train different personnel in different hardwares and softwares. Nevertheless, whether fearlessly or foolishly, AMA's questionnaire asked respondent Centers to supply the number of people trained by various methods in 1985 and due for training in 1986. A judicious study of the figures yields significant and trustworthy data.

First among these discoveries is that while the number of people to be trained in 1986 will increase by 25 per cent over 1985 levels,

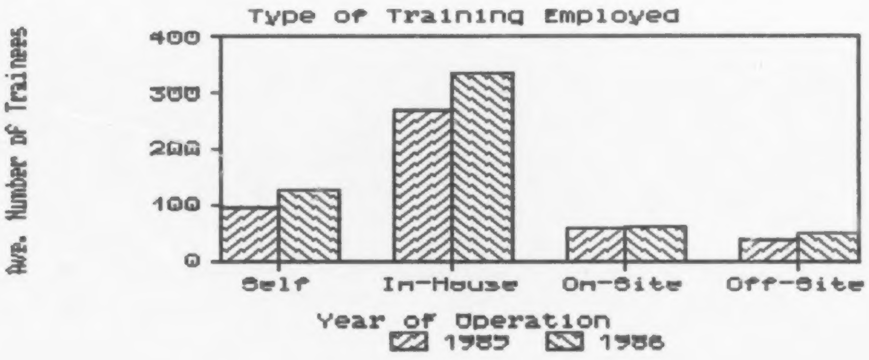


FIGURE 25. Demand Increases, But Shares Remain Constant

no real change will occur in the relative shares assigned to in-house trainers (58.7 per cent), self-instruction (22 per cent of all 1986 training), or contracted providers of training programs, either on-site (10.7 per cent) or off-site (8.6 per cent). All are growth markets, but contracted on-site training is growing at only half the rate of the other three types of delivery.

In the competition between hardware and software vendors and independent trainers each sector is holding its own, with independents gaining about seven per cent of the market share in on-site programs and losing it right back in off-site delivery. The combined numbers announce the standoff. Vendors provided 62 per cent of contracted training services in 1985, and will provide 61.8 per cent in 1986.

All of these training contacts will make greater use of computer-based training than heretofore. Again, we are at a cusp: 1986 will be the first year in which more training programs will use tutorial disks in their instruction than written manuals or audio cassettes. The tools were in equal use in 1985, but this year, while use of manuals and cassettes will remain static, 16.4 per cent more InfoCenters will oversee some use of CBT training, and the number of trainees using tutorial disks will increase by an impressive 60.6 per cent.

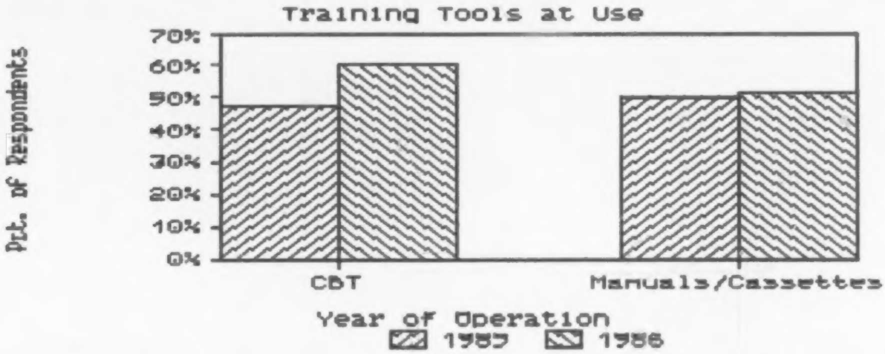


FIGURE 26. Computer-Based Training Takes the Lead Over Manuals and Cassettes as Training Tools Offered Through InfoCenters

The 1985 CRWTH Survey of Information Centers, performed by a major provider of computer-based training, points out that about 65 per cent of all CBT courseware is purchased off-the-shelf, about 20 per cent is authored in-house, and the rest is contracted for. The CRWTH respondents indicated "more individualized training" and "better training availability" as the most important benefits. The respondents interviewed by our staff most frequently mentioned an easing of the training load for in-house trainers and cost effectiveness. A typical comment: "We'll be training about 50 people next year with CBT -- about 20 per cent of the total training activity. Why? I'm the only trainer."

As to the one in five InfoCenter trainers who write their own tutorial programs: "It takes over a hundred hours of programming to create one hour of instruction," said a respondent with a specific application in mind, "but it's the only way I can get the kind of program I want."

Training Budgets. Overall, 1986 training budgets exclusive of staff salaries will increase by about 19 percent over their 1985 levels, according to the 410 respondents who gave us numbers. Since the number of trainees will increase by 25 per cent, Information Centers expect to get more for their money in 1986, and will be judging computer-based training by its cost effectiveness as well as its competence in teaching the basics.

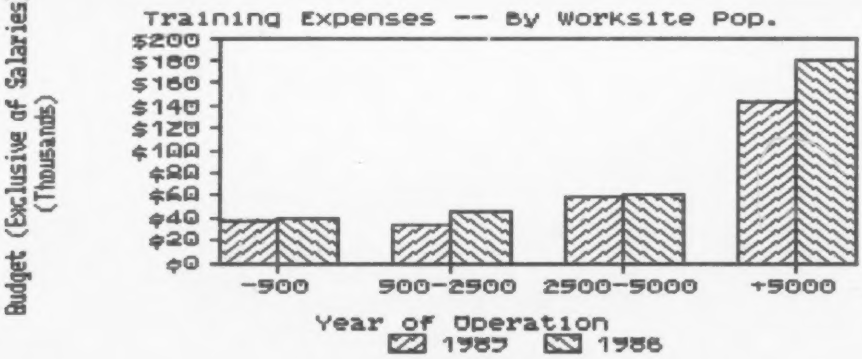


FIGURE 27. For the Total Sample, the Average Training Budget (Excluding Salaries) was $45,800 in 1985, $54,500 in 1986.

Type of Training. Only one Information Center in twenty escapes some sort of training responsibility. The major training load has to do with microcomputers: 83.4 per cent of the AMA sample train end-users in micro hardware, 86.4 per cent in micro software. Mainframe technology is a lesser consideration, especially to newer Centers; mainframe software training is provided by 68.8 per cent of the whole sample, 85.3 per cent of the mature Centers. Mainframe hardware training breaks out similarly, as a job for 42.2 per cent of the whole sample, 57.4 per cent of mature IC's.

How busy are InfoCenters with each particular training task? We asked respondents what sort of training they provide, then offered a four-point scale to rate the frequency of such requests. Table 6 shows that the middle-management and exempt professional classes which dominates the end-user community still demand training in spreadsheet software. In that and other categories, there is evidence that end-users want to learn popular software packages rather than create their own applications. Just over half the respondent Centers provide training in programming languages, and only 15.9 per cent cite it as "frequently requested".

TRAINING TASKS AND REQUESTS

	Pct. Doing Any Such Training	Pct. Doing "Very Frequent" Training
Programming Languages	57.3%	15.9%
Use of Hardware	92.3%	43.3%
Software Training:		
Spreadsheets	90.4%	60.9%
DBMS	86.0%	35.9%
Word Processing	86.0%	54.1%
Graphics	77.6%	24.2%
Communications	73.0%	12.9%
Finance/Accounting	51.4%	5.3%
Project Management	42.3%	5.9%

TABLE 6. Training In Use Of Spreadsheets Remains the Number One Request from End-Users; Graphics Training Is Growing Swiftly

New Centers do more training than mature ones; pre-'84 Centers receive significantly more frequent requests for every sort of instruction. A higher percentage of high-population worksites train end-users in graphics and project management software, reflecting the greater variety of tasks done at such locations.

Currents Behind the Changes. Asked to say, in general, what changes they foresaw in their Information Centers within the next five years, many respondents pointed first to the training role. "Less instruction in the basics" and "More consultation, less teaching" were common answers, especially from the more mature InfoCenters. "We won't be babysitting our users quite so much," said a respondent from an electrical components manufacturing firm in the Midwest "We won't be doing all this computer literacy stuff," said a representative from a chemicals firm in the Southwest. "We won't be spending all this time with the beginners," a West Coast respondent agreed.

"As it now stands, we do all their thinking for them," noted one manager. "They won't even try to solve a problem without consulting us. This just has to change." One respondent, from a manufacturer of automotive parts, went so far as to say that "five years from now, we'll be near extinction. The users will have absorbed enough fundamental operating skills and enough experience to provide self-consulting expertise."

If Information Centers were dedicated primarily to solving problems with computer literacy, this forecast might prove accurate. The vast majority of respondents, however, see a shift in educational responsibility rather than retirement for their trainers. After all, these Centers are staffed with highly competent technicians, and less hand holding spells more opportunity for a variety of support services: networking, access to corporate data, closer work with MIS in development, and more applications work for the user clientele. In short, it means "a more dynamic relationship with the users," as a respondent from a benefits consulting firm put it. "We'll become the heartbeat and lifeblood of the company," said another. Obviously, respondents welcome the change.

Some commentators have described the role change in terms of the "Phase I" and "Phase II" training alluded to earlier. Phase I is product specific, task specific, and very basic; Phase II involves multiple tasks and the integration of hardware and software. A series of telephone calls to respondents selected at random indicated that these terms are, indeed, meaningful. One respondent embellished the concept by pointing out that there was often a Phase I-A training wave in which the trainer-consultant helped users became fully proficient in a particular product (a spreadsheet, perhaps) and then helped them move to another, more sophisticated product in the same category. For many respondents, the Phase II wave is breaking on top of the Phase I wave, with the I-A backwater pushing the flood of requests higher.

How are the Information Centers coping? One tactic is to cultivate more local-turf experts. ("We're doing it as a matter of survival," said one manager.) Another tactic is to shift the new Phase I requests to another training channel: CBT, vendor manuals, contracted services, and the like. Here's how one InfoCenter trainer from a steel manufacturer in the Midwest put it:

> We started as a mainframe operation, and we used a stand-up lecture approach. People would sign up again six months later for the same program -- and ask the same questions. We realized it was a pretty inefficient operation, and we really just didn't have time for this kind of thing. Maybe they were just coming to get away from their work. We now ask everyone who wants training to go through three or four hours of CBT before they come to class. It helps tremendously.
>
> On the pc side, we also force people to go our way -- tutorial on the pc's for those who like the comfort of a tutor, video in the department for others, and for those who like the safety of an off-site classroom, we monitor programs in the area for quality and make recommendations. We publish a list of options and say, "Here are the best."
>
> We also develop "resident experts" -- specialists in various packages in various departments. This pays off for us handsomely, in terms of making the applications work for a department -- and it relieves the training load. It gives us a cushion. For example, we recently lost our FOCUS expert a few days before a training session. We simply called the local experts and asked them to fill in. In other words, we call them for help!

Can Phase II training be contracted out? Not easily, according to our respondents. As one respondent at a large East Coast academic testing service put it, "We are automating a company-wide process that used to be done with index cards. What we do is unique. It would be difficult for anyone else to learn our system and our way of doing things."

A respondent from a West Coast auto manufacturer explained that his firm had contracted with an independent vendor for virtually all Phase I training. The company started its Center in 1985, and the five-person staff assumed responsibility for an existing user base of approximately 125 managers, plus responsibility for training an additional 300-plus employees. The training program, working off a customized version of FRAMEWORK II, was highly effective, according to the respondent. "We were able to move in and say, 'here's the hardware, here's how you will use it, and here's the product you will use.'"

Will there be a second wave? "Yes -- individual consulting, which is exactly what the IC is designed to do," the same manager responded.

"The IC person has to be 'ego-less'," the respondent added. "We recognize this and emphasize it to our staff. Look, every user we train will typically exceed our knowledge within a matter of months. We use a large number of products, whereas the user is working with one or two. He's going to learn those products inside-out because he's working with them in a heads-down environment."

This leads to what another respondent terms the "Sam phenomenon." "People are working on something and they hit a problem. Someone says, 'That guy across the hall -- Sam -- he knows this package. Call Sam.'"

Some respondents see the training question complicated by an inability to purchase high-quality Phase I training tools. One respondent noted that he had very good luck with one product. "But the company went out of business, and finally the machine died. It was a little audio-cassette computer interface. It finally died, and we haven't found anything of equal quality to replace it."

The shift in training roles is creating the need for more effective Phase I tools. IC managers are, however, discriminating customers, not likely to be taken in by inflated claims about a particular tool's effectiveness.

5

SPECIAL ASSIGNMENTS:

A SENSE OF PLACE

Two years ago, there was no common agreement on an InfoCenter's responsibilities within a corporation. At the 1984 Information Center Conference in Boston, a registrant rose at the end of a seminar to confess, "I came here to find out how to start an Information Center, and what I found out was that we already have one." Two years later, IC roles have far more definition, and this Report reflects that in its organization: evaluations, authorizations, and training.

In the past, "special assignments" have been far more of a grab bag. A series of jagged lines would appear on graphs showing which Centers carried such duties as directing hotlines or repairing hardware or overseeing timesharing operations. Generalizations were difficult. That is still true today, but less so than in the past. Patterns have become easier to discern.

Creating Applications Software. Perhaps the most interesting of these patterns has to do with writing software for special applications. Five years ago, InfoCenters routinely wrote special applications software. Two years ago, far fewer performed such tasks. Today, the curve points upward once again.

The explanation harkens back to the difference between "Phase I" and "Phase II" training discussed in the preceding chapter. In earlier days, programmers at the Information Center wrote software for end-users because there was no alternative. Then came VisiCalc and LOTUS 1-2-3, and with them hundreds of pre-packaged software for every manner of application (among them a special set of programs for religious organizations called CompuChurch). The IC staffer could now scan a catalog and usually find a software package which, if not exactly right

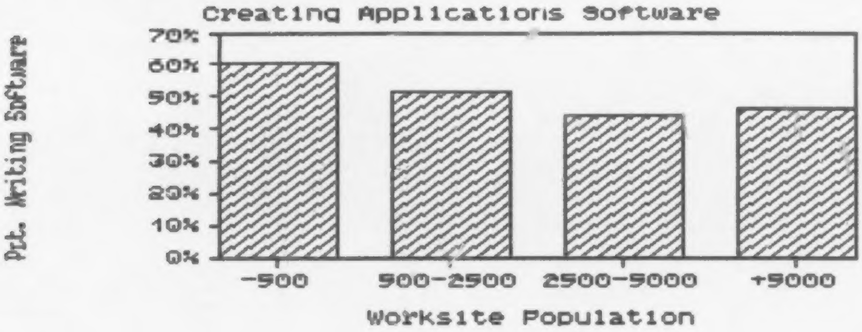


FIGURE 28. InfoCenters at Small Worksites are More Likely To Write Special Applications Software. Overall Average: 53.9%

for the end-user, could be altered to his or her special requirements without extensive work. Thus the Information Center shifted its work from writing software to shopping for it. But as end-users become more sophisticated in their understanding of a computer's capabilities and more exact in their requirements for software, InfoCenter programmers must go back to work.

Sylvia Carcieri, an IC manager for the Rhode Island-based CVS Corporation, puts the case in these terms: "The Information Center has to analyze what the end-user has conceptualized, and explain to the end-user what he or she can do. Software is easier and easier to use, but it's also more sophisticated. The end-user also has to become more sophisticated."

Ultimately, end-users may reach a level of computer literacy where they do all their own computing, including programming. "Most engineering people we're seeing at the entry level have as much hands-on experience as computer science people," according to Dick Hauser, a Pittsburg-based planning consultant. His InfoCenter has "progressed to the stage where we are putting out fires rather than holding hands."

Overall, a little more than half the respondent Centers create some special applications software. Centers at worksites with fewer than 500 workers are more likely to bear such responsibilities than those at large worksites, but the start-up date no longer matters; 54 per cent of both new and mature Centers do this sort of work.

Other Tasks. In other varieties of special assignments, InfoCenters at larger worksites are more likely field a variety of tasks. Figure 29 demonstrates this, but also shows that it is no sure thing. Overall, two-thirds of the AMA sample man an in-house hotline, and just over half of them maintain and repair the machinery.

Many Information Centers originated in timesharing operations, where DP managers allotted computer time to end-user departments. Only one Center in five retains this vestigial responsibility. Not many run in-house computer stores, either -- less than 20 per cent of the whole sample. The InfoCenter is far more likely to buy computer technology on the end-users' behalf than sell it to their departments.

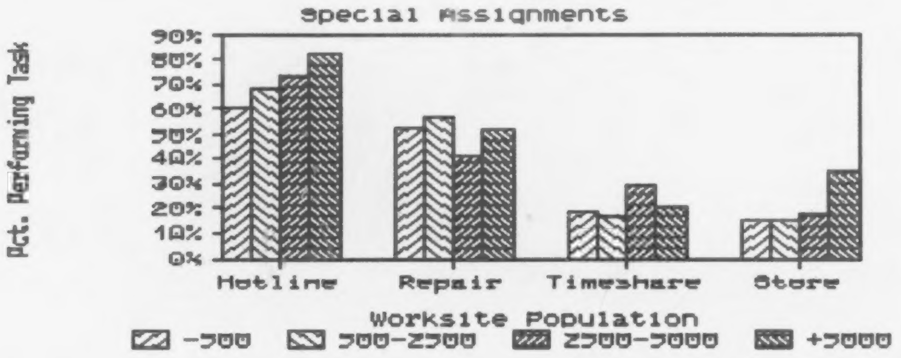


FIGURE 29. Directing Hotlines for End-Users and Maintaining and Repairing Machines Are Common Information Center Services

In sum, practically all Centers carry at least some responsibility beyond evaluation, authorization, and training, but what those special assignments may be depends on the special requirements of the worksite and the end-user community. End-user requests in this area focus on getting the technology up and running and on connecting it to other computers, by wire or by phone. Nearly seven out of ten InfoCenters fielded requests for help in dial-up communications in 1985, and 13.2 per cent of our respondents received such requests "very frequently." Six out of ten were asked for help in setting up local area networks, but few -- 8.7 per cent -- rated this a "very frequent" event.

Budgetary Relationships. Being so many things to so many end-user departments, and mediating between all of them and the data processing function, may create an "identity crisis" for the Information Center. Although helmsmen for the organization's information system, IC's are distinct and separate entities. More than a third have budget lines entirely detached from the corporate MIS function -- more so in large organizations than small ones, as Figure 30 demonstrates.

And if the InfoCenter is more frequently a part of MIS in smaller companies, it also takes up a larger share of their MIS budget. Overall, IC's with lines on the MIS budget account for 13.7 per cent of that budget; in small companies, though, the average InfoCenter share is 24.5%. Moreoever, the share is growing. Seven out of ten InfoCenters plan to increase their operating budgets in the year ahead, by an average of 23.4 per cent. Of the remainder, half will stay at current levels, and 14.2 per cent will undergo budget cuts -- generally in small companies, and usually because equipment purchases associated with start-up are complete, or because the largest share of "Phase I" training has been accomplished.

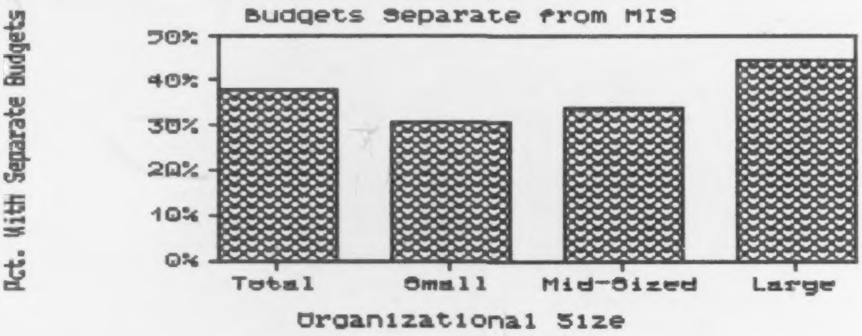


FIGURE 30. Large Numbers of IC's Have Independent Budgets

InfoCenters are in a curious bind. They deal with data and information technology, but at many companies they do so as outsiders looking in; where they are a formal part of the MIS/DP function, they act as insiders looking out. This creates strain. Moreover, they are in competition with other elements of the organization, even though this may be unspoken. End-user departments must be results-oriented, and if they can accomplish their tasks though the Information Center, well and good. If there is another, better way, they will seek it out. Information Centers must prove themselves again and again.

MEMORANDUM

To: All Employees

From: Director, Corporate Communications

Subject: END-USER PUBLIC RELATIONS

Effective this date, the public relations system heretofore centralized in the Public Relations Department will yield to a new system of "end-user public relations."

Attached to this memo, please find:

- A list of national, regional and local press contacts, including columnists, editorial writers, feature writers and general reporters, as well as network and local television and radio news editors.
- A copy of "The Elements of Style" by Strunk and White. The rules of grammar and construction given here are to be followed in all written public relations material.
- A Kodak Instamatic camera.

From this date forward, if you have any product or activity which you think newsworthy, you are to write a press release, take an appropriate photograph of the product or people involved, and mail both the story and the picture to whatever press contacts you think would be interested in the story. If the story seems especially important to you, use the phone numbers in the press directory to call the editors and reporters you select.

The Public Relations department stands ready to assist you at your request, and they will continue to be responsible for overall corporate publicity and public relations. For departmental or individual needs, however, the "end-user" is in charge.

CLOSE-UP

DP Strikes Back!

Confessions of a Mainframe Man

Imagine, if you will, receiving one morning the memorandum on the previous page, heralding the arrival of "end-user public relations."

The only thing more remarkable than such a policy (or more chaotic in its eventual result) would be to find a life-long public relations specialist who would go along with the idea. Similar reactions might follow declarations of "end-user accounting" or "end-user engineering." The concepts simply do not deal with the realities of organizational responsibility and specific expertise.

And yet the data processing manager is the butt of every joke among proponents of end-user computing. Alone among professionals with recognized expertise, the computer scientist is expected to smooth the way for the non-expert to do the job once entrusted to the specialist.

An open-ended question in the 1985 AMA Report on Information Centers asked respondents, "In the long run, what is the best way to control end-user computing?" Many InfoCenter managers responded that the question was not one of control but of support. This view was echoed in phone interviews with IC directors who confided that in truth support equalled control -- "You get more control by supporting certain hardware and software than you do by issuing commands," said one.

But Information Center managers are advocates of end-user computing by nature and by the demands of the position. Attitudes differ in regions dominated by mainframe men.

One of them, a twenty-year veteran of the computer wars who now works in systems development for one of the world's largest financial institutions, spoke his mind to our editors on the subjects of end-user computing in all its aspects. The "Old Vet," to whom we promised anonymity, laid it on the line in words some InfoCenter managers hear all too often, but many end-users have never heard.

A First Attempt. The Old Vet's company made an early try at end-user computing by dedicating a minicomputer entirely to end-user needs. "The question was, 'Should end-users get the right to pick whatever they wanted to do, and do it independently of the large corporate data centers,'" our man recalls. "The idea of it was to 'let a thousand flowers bloom,' and it got end-users quite excited about things. They could contract for services with self-employed contractors and other vendors to modify packages to support their very own needs.

"Although the official company verdict on the project was that it was a 'mixed success', the impression I got was that it was an unholy mess," the Old Vet reports. But the attempt failed for reasons of corporate culture rather than technology. "In the culture of the organization people make their mark in very short order, a year or two, and then move on. Consequently, one vice president [of an end-user department] might leave, a new v.p. might come on and open a door and find a hundred terminals tucked away. God knows what they had been budgeted for or used for. Some of the problems that I believe exist with separate computers were exacerbated by this kind of approach.

"And security! I've seen people walking around with little three-and-a-half inch floppy disks in their pocket. That's completely insecure. I would never trust any kind of sensitive information to that kind of situation. I think this poses some very large threats -- besides the fact that any computer hacker can get into a network through a personal computer and access the mainframe."

But Information Centers are in business to deal with these problems, we pointed out. End-users are not out there on their own. The job of the InfoCenter is to oversee and coordinate end-user activity.

"If it is, it does a hell of a poor job," said the Old Vet, warming to the subject. "They're not part of the data processing department; they're antagonistic toward the data processing department; they represent a dilution of power for the data processing department.

"Oversee and coordinate? Where I work, there is a corporate technology committee headed by some very experienced people which comes out with all kinds of pronouncements which are very studiously ignored. Why? Because that's not the way of the organization. The way of the organization is as follows: the user wants a data processing solution. What will he do? Number one, he will go to his data processing organization and make the request; number two, he will go to the Information Center if there's one available and make the same request; number three, he will also go to an outside contractor and pay him to do it -- exactly the same thing. Will he tell one person he is doing the other? He will not. Furthermore, he might, if he possibly can, steal any other packages around to do the request.

"Why do they do it that way? Because you are rewarded for succeeding, not for making excuses about the data processing backlog. Nobody was ever hurt by succeeding well and overspending their budget. In this sort of fast-moving environment, you cover your bases."

Back to the Backlog. Because the Old Vet had mentioned the data processing backlog which is apparently at the heart of such a problem, we questioned him on the subject -- and received a wave of the hand.

"The idea of a computer backlog in data processing is illusory," he assured us. "There is certainly a large-scale backlog, but it's a large-scale backlog on large-scale applications. The reason the backlog is large-scale is that the applications are large-scale. Most of the backlog is against large, complex systems, and these things have to be done there.

"The idea of using individual pc's would be for individual people to massage a great deal of data that would be looked at many different ways. In other words, people could say, 'I would like to see a breakout of our expenses by this-and-such, and maybe we could add a few different account breakouts of the data to be able to better pin down expenses.' That might be done on a personal computer, but very often it requires massive information selection on mainframe systems.

"There's another matter, too, which I might hesitate to mention: end-user computing requires relatively intelligent people. It is not easy to use a computer, even with a highly-modified software package, and when you start getting involved in really user-friendly things, you're not getting the touted 'flexibility' that you're trying to do. And it's not easy to figure out how much of a sample you need to have statistical validity, and most people aren't asked to do it or trained to do it, or want to do it.

"What end-users really want is a data-integrated system, mainframe and personal computer, that lets you ask any musical question you like, decides the minimum amount of data it needs, figures out where to get the data, makes the request of the mainframe for the data, sends it down as fast as possible over a dial-up line -- because it costs money every minute it's operating -- turns off the dial-up line, and then proceeds to chug along on the data."

A Clutch of Clusters. And are such magical systems available? "There might be a market for vendors in intelligent computer terminals, clustered terminals, clustered computers," said the Old Vet, unaware that he was contradicting the AMA survey findings that point towards more micro's and fewer terminals. "These little personal computers are more powerful than an individual needs. You're talking about a Ferrari being used to drive down to the supermarket, when all you need is something with four wheels and an engine.

"So where vendors should be going is toward clustered computers; integrated, possibly artificial intelligence oriented software with spreadsheets; and dial-up modems that can tap into mainframe data when they need it, and download it as fast as possible. And all IBM compatible, all Big Blue -- nobody was ever fired for using IBM.

"Cost is important. Office productivity is another large boondoggle in this world, along with Information Centers run by really less than technical people for less than really technical people, providing less than really tangible benefits. Part of the problem boils down to 'Who needs it?" As your own research shows, most of the people who need it are in the corporate headquarters. They're staff personnel, who are being asked to do specific strategic analysis of data. That is a good reason to use a personal computer, but how should it be linked up? Is there a real cost saving to it? It's hard to tell.

"Cost reasons, actually, have dictated a centralization and reduction in the number of data centers. When things were flush, there were six, then four; now there is a single data center. This was done on a cost basis. So that's a little bit of what's going on. There are different phases. This is a cyclical thing within an organization. This particular phase is one of centralization phase, and we're building very, very big and powerful mainframes and database machines.

"I don't know if a computer makes people particularly more productive," the Old Vet mused. "I don't know if their ability to function on the job is impacted significantly by more rapid access to data. You can ask a lot of dumb questions and get an answer quite quickly. Well, then, what do you do with it? You can access the data, you can download the data, you can get as much data as you can possibly handle; the real question is, what are you going to do with that data?"

Hoping that the Old Vet had not just defined AMA's survey efforts, we asked if that was the role an Information Center might profitably play in an organization such as his -- aiding end-users to ask the right questions.

"I haven't seen much from the Information Center where I am," he responded, "mainly because there is a competitive attitude among the people there. They want to pick out their own machines. Any time there's been an effort to standardize things, it's met a great deal of resistance, because our company is filled with very ornery, aggressive technological mavericks who take pleasure in knowing that they have the best technical solutions -- their own solution over everybody else's solution."

Winning the Pennant. "And then the real problem I see with the Information Center is that it's not within the DP department," the Old Vet continued. "It's like color wars all the time -- the team with the best technical solution wins the flag. And the Information Center is just another competitor in the game.

"The problem with our first experiment in end-user computing was lack of standardization. It made magnitudes of difference in costs. Consequently, it led to the greater centralization later on. So perhaps the Information Center's role should be terminal selection. What's your job, what do you need to do it, that kind of checklist situation.

"But I think information itself is a most important corporate resource. Information is power. The decisions allocating information are made at the highest corporate level" -- a level to which, in the opinion of the Old Vet, the Information Center should not aspire.

6

HANDS ACROSS THE WATER:
A TRANSATLANTIC PERSPECTIVE

Of all European economies, none is more like our own than the Dutch. Service industries claim an increasing share of the gross national product at the expense of manufacturing; sophisticated technology is the rule in both process and product. Most important to the expanding field of end-user computing, a huge percentage of the Dutch white-collar workforce is English speaking -- a fact which allows Dutchmen to use the fourth-generation languages not yet available in native European tongues.

Shortly after AMA surveyed the American scene for its 1985 Report on Information Centers, Database Consultants Europe conducted a similar study in Holland. DCE is British owned and managed but headquartered in Amsterdam, and provides consulting services to leading Dutch concerns. It also directs conferences and courses, some through AMA International's Management Centre Europe in Brussels.

In October 1985, AMA's project director travelled to Amsterdam to converse and compare survey findings with DCE. That comparison revealed important similarities in achievement and concern, but it is perhaps the isolated differences that are most interesting.

The biggest challenge to Information Centers and end-users in the Netherlands, and to all to the non-English speaking countries on the Continent, is the monopoly of the English language in software products. As we will see, this language barrier has far-reaching repercussions on the market value of American-made software in the Netherlands, and on how confident Dutch Information Centers are that they can handle the emerging computer technology.

Thoroughly Modern. American dominance in computer technology is often taken for granted, as is the notion that anyone else is necessarily "behind the times." Not so in the area of personal computing, according to DCE's figures. An overwhelming majority of their respondents, representing most types of commerce and industry, are currently engaged in personal computing, and in the case of large organizations (5,000 employees or more), all have personal computing facilities in place. DCE confidently reports that, "personal computing is very widespread in business life in the Netherlands."

Likewise with Information Centers. Almost 70 percent of DCE's respondents either have or expect to have a "Personal Computing Centre" within a year. As in the United States, the majority of Information Centers have been set up recently, in 1984/1985, coinciding with the boom in microcomputer technology.

The vast majority of DCE's respondents expect that more and more of their employees will spend at least 20 per cent of their time doing personal computing. This finding is in line with The 1985 AMA Report's challenge to the accepted notion of many here in the United States: that microcomputers are sitting idle, used on the average less than one hour a week.

Strategies and Roles. Just as training in the use of microcomputers is the primary task of American Centers, Dutch IC's spend most of their time providing advice and guidance to their end-users, rather than creating application software for them. The stress seems to be upon the end-user as the analyst/programmer, while the Info Center may provide "support" or instruction so that the end-user can create his own applications.

Also like their American cousins, Dutch IC's play an important role in investigating and selecting micro hardware and software. But unlike the U.S., European IC managers seem to play a greater role in the purchasing decision: "assistance in purchase/installation" heads the list of services provided for software packages, cited by 80 per cent of the respondent Centers as a regular activity.

Improving DP/end-user relationships or easing DP backlog didn't seem to be a concern for Holland's InfoCenters. "Completing applications produced by the DP" ranked low on the list of the InfoCenter's activities, with fewer than a third providing such services. Unlike American claims that DP managers are guarding their data in the face of the microcomputer onslaught, the DCE reports an entirely different picture in the Netherlands:

> For the technically-minded data processing professional, the increase in emphasis on personal computing provides a pleasant relief. The difficult business of establishing requirements is left with the person who knows best -- the end-user. Even better, there is hope that this same end-user will be able to write most of his application code, using fourth-generation languages or application builders. Such data processing professionals will happily become even more specialized in the intricacies of hardware and software.

How successfully are Holland's IC managers doing their jobs? As in the United States, respondents have a very optimistic outlook toward their future, expecting to become more and more supportive of personal computing. Any current problems with personal computing applications were attributed not to the InfoCenter staff itself, but to other sources, particularly the end-user. "...One of the biggest problems is that users underestimate how much of their own effort is required in producing application systems," says the DCE report. "Systems development costs have usually been underestimated, and it seems unlikely that the end-user will be any more successful in the future than the data processing department has been in the past." If anything, Dutch IC managers saw themselves as understaffed, citing "shortage of professional support" as the other major problem with micro applications.

Costs and Benefits. The benefits of personal computing to the Dutch business community centered around the end-user: it provided quicker solutions, improved job efficiency, and reduced frustration with the DP department. Some respondents claimed that productivity increased by as much as 50 percent. Increased end-user productivity also topped the "Benefits Realized" list of the AMA report. Reduction of DP backlog ranked low on both lists. On the whole, DCE's respondents are very optimistic of the benefits of personal computing.

DCE reports that among its respondents, "Budgets for personal computing are clearly on the increase," and that "this is consistent with the optimism shown for the benefits of personal computing." Sixty per cent of DCE's respondents are either currently charging the costs of personal computing back to the end-users or plan to do so. AMA, on the other hand, found that American chargeback policies are split roughly half and half: half of America's InfoCenters absorb costs into their own budgets, while the other half charge their services back to the end-user departments.

As in the United States, Dutch IC's have a difficult time giving a cost justification for personal computing. Performing a cost/benefit analysis is seen as the primary policy/strategy problem among DCE's respondents, and they see themselves making no significant headway in the near future.

Language Woes. For the European end-user community, there is no escaping the fact that American suppliers dominate the software product market, and that the first language for their software documentation is English. Among DCE's respondents, the fact that documentation is not in the Dutch language rates as the most serious problem with personal computing software packages. Software is also not user friendly enough, and documentation does not match the users' requirements; DCE suggests that these two problems may stem from the primary complaint about the language barrier. Respondents see no significant easing of all three problems in the future.

The non-English speaking, European end-user community may provide an untapped market for software developers. According to DCE:

> There is some evidence that software developers are becoming more aware of this [language] problem and also of the potential of European markets, but to what extent they can resolve the problem is uncertain. Certainly this stumbling block must be overcome or circumvented to allow full exploitation of personal computing technology in the Netherlands. This may indicate that there is a much larger market for software development in the Netherlands than has previously been envisaged, because of this language problem.

Dutch IC's are also concerned about the increase in hardware and software costs and the lack of back-up/support from suppliers, an issue which concerned American IC's as well. In addition, DCE's respondents believe that there are too many software packages and too many versions of the packages on the market. On the whole, the respondents see these problems as getting even worse, not better.

Clouds Today, Sunny Tomorrow. The emerging picture of the Dutch Information Center is paradoxical at best, downright confusing at its worst. On the one hand, DCE reports that "Our respondents have a very positive attitude towards personal computing," while on the other, they report that, "The current success of the Personal Computing Centre does not present a very encouraging picture, with only 10 percent of the respondents considering their centre to be very successful." Dutch IC's seem to be very optimistic about their future, promising "greatly reduced systems development costs through the use of advanced software environments."

However, they seem unsure that the system they now have in place will be able to handle the emerging technology. "The personal computing revolution of 1984 has taken many organizations by surprise," says DCE. Since most of the Dutch IC's were formed only very recently, DCE claims that they are in an experimental phase in which, "the setting of policy and strategy for the unit seems to lag behind its formation."

As in the United States, Dutch IC's have found that even though the unit cost of computing equipment has reduced dramatically, quantifying the hard dollar benefits from such equipment is "not an easy matter." Some Dutch companies have already concluded that computing costs outweigh their benefits, and blame the uncontrolled, unmanageable growth of micro's. DCE cites the need for Dutch IC's to establish some kind of organization structure: "There is considerable uncertainty over the definition of responsibilities, and confusion as to what services and levels of support are to be provided..." Their parting wisdom to readers is ominous: "Organizations need to plan their approach to personal computing carefully and to develop a strategy which is in tune with the objectives of their business. Otherwise there is a high risk that expenditures will become very large, while benefits remain small."

METHODOLOGY

The primary instrument used to collect data for this report was an eight-page questionnaire on the management and costs of end-user computing in organizations with discrete end-user assistance programs. The questionnaire requested data in 43 distinct areas of inquiry, and additional facts on organizational size, business activity, and location.

The questionnaire was mailed during the first week of April 1986.

Information Centers begin, develop and change rapidly. Because AMA wanted a "snapshot in time," a picture of Information Center activity at a particular moment, it cut off responses on May 2, 1986, by which time 529 usable responses had been received. They form the statistical base for this report.

In April and May, the AMA staff conducted interviews with dozens of Information Center managers and representatives from vendors of computer technology. The purpose was to test, probe, and expand upon the numbers gathered by the questionnaire. This material, added to ongoing studies of the management of information technology, are the basis of the present report's analysis and commentary.

AMA's cooperation with Information Center Magazine was not editorial in nature. The magazine's editors reviewed a draft of the questionnaire and made helpful suggestions. Weingarten Publications supplied the mailing list for the questionnaire, and acts as consultants in the marketing of the report through AMACOM, AMA's publishing division. But the content of this report is the sole responsibility of the Membership Briefings and Surveys department of the American Management Association.

Appendix

The following tables break out questionnaire data by four categories:

- Organizational size, as determined by annual sales or, if a public sector or non-profit organization, by annual budget. This figure defines the entire organization, not the workplace where the respondent Information Center is located.

- Worksite Population, the whole number of employees at the worksite where the respondent Center is located.

  Please note that the cell for worksite populations of 5,000 or more contains only 39 respondents. A number of these respondents did not provide data on current or projected installations (see "Not Reported" horizontal rows). This further complicated the problem of a small sample. Care should be taken in dealing with that cell.

- Worksite Description, in terms of its place within the entire organization: corporate headquarters, division or branch site, or a site with all major corporate units (save sales and service offices) under one roof.

- InfoCenter Maturity, where pre-'84 start-ups are side-by-side with those begun in 1984-86.

Respondents were requested to answer questions as they pertained to activities at their own worksites, rather than company-wide.

Reading the Charts. The first entry in each vertical column is the number of respondents in that category. Immediately below this is that number expressed as a percentage of the column total.

Tables were selected on the basis of their potential utility to our readers. They are organized as follows:

Tables	Content
A1 to A2.	Total Information Center staff, current and projected.
A3 to A8.	Number of machines: standalone microcomputers, linked micro's, and mainframe or minicomputer terminals, current and projected.
A9 to A23.	Anticipated 1986 expenditures for hardware and software, mainframe/mini and micro. Respondents were asked to supply dollar amounts to be spent in support of end-user computing; thus these figures may not be read as total corporate expenditures on computer technology.
A24 to A27.	InfoCenter responsibility and authority in evaluations and purchases of computer technology for end-users.

The entire AMA sample, defined by business activity, appears on a Table that follows the charts.

TABLE- A1
SECTION- 1 QUESTION- 3

TOTAL NUMBER OF PERSONS AT INFOCENTER
-- CURRENT --

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION			YEAR INFO- CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORP- ORATE HEAD- QUAR- TERS	DIVI- SION SUB- SID- IARY/ BR- ANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARL- IER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529 100.0	85 100.0	84 100.0	81 100.0	64 100.0	154 100.0	177 100.0	243 100.0	65 100.0	39 100.0	250 100.0	171 100.0	100 100.0	204 100.0	313 100.0
MEAN (INCLUDING NONE)	6.7	5.5	4.2	5.8	5.2	9.9	4.9	5.6	9.9	16.3	7.8	5.6	5.7	9.5	4.6
MEDIAN (INCLUDING NONE)	4.5	3.9	3.5	3.7	4.1	6.2	3.7	4.4	6.0	8.8	4.9	4.2	4.1	5.7	3.7
MEAN (EXCLUDING NONE)	6.7	5.5	4.3	5.8	5.3	9.9	4.9	5.6	9.9	16.3	7.9	5.6	5.7	9.5	4.6
MEDIAN (INCLUDING NONE)	4.5	3.9	3.5	3.7	4.2	6.2	3.7	4.4	6.0	8.8	4.9	4.2	4.1	5.7	3.7

TOTAL NUMBER OF PERSONS AT INFOCENTER
-- PROJECTED ONE YEAR FROM NOW --

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION			YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORP-ORATE HEAD-QUAR-TERS	DIVI-SION SUB-SID-IARY/ BR-ANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARL-IER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529 100.0	85 100.0	84 100.0	81 100.0	64 100.0	154 100.0	177 100.0	243 100.0	65 100.0	39 100.0	250 100.0	171 100.0	100 100.0	204 100.0	313 100.0
MEAN (INCLUDING NONE)	7.7	6.6	5.4	7.3	6.4	10.4	5.8	6.9	12.0	15.3	9.0	6.6	6.6	10.4	5.7
MEDIAN (INCLUDING NONE)	5.5	5.1	4.7	4.4	5.4	7.5	4.6	5.4	7.4	9.6	6.2	5.4	5.0	6.9	4.7
MEAN (EXCLUDING NONE)	7.7	6.6	5.4	7.3	6.4	10.4	5.8	6.9	12.0	15.3	9.0	6.6	6.6	10.4	5.7
MEDIAN (INCLUDING NONE)	5.5	5.1	4.7	4.4	5.4	7.5	4.6	5.4	7.4	9.6	6.2	5.4	5.0	6.9	4.7

TABLE- A3
SECTION- 1 QUESTION- 5

NUMBER OF STANDALONE PC'S SERVED BY INFOCENTER
-- CURRENT --

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION			YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORP-ORATE HEAD-QUAR-TERS	DIVI-SION SUB-SID-IARY/ BR-ANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARL-IER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529 100.0	85 100.0	84 100.0	81 100.0	64 100.0	154 100.0	177 100.0	243 100.0	65 100.0	39 100.0	250 100.0	171 100.0	100 100.0	204 100.0	313 100.0
NONE	50 9.5	14 16.5	7 8.3	5 6.2	3 4.7	18 11.7	21 11.9	15 6.2	7 10.8	5 12.8	22 8.8	20 11.7	6 6.0	21 10.3	26 8.3
1-4	43 8.1	12 14.1	14 16.7	3 3.7	3 4.7	7 4.5	20 11.3	17 7.0	5 7.7	1 2.6	11 4.4	16 9.4	16 16.0	13 6.4	29 9.3
5-9	32 6.0	5 5.9	8 9.5	6 7.4	3 4.7	4 2.6	13 7.3	16 6.6	1 1.5	2 5.1	14 5.6	10 5.8	7 7.0	8 3.9	24 7.7
10-19	48 9.1	16 18.8	7 8.3	4 4.9	5 7.8	11 7.1	24 13.6	20 8.2	3 4.6	1 2.6	17 6.8	20 11.7	11 11.0	19 9.3	28 8.9
20-49	88 16.6	15 17.6	19 22.6	19 23.5	13 20.3	14 9.1	40 22.6	40 16.5	6 9.2		35 14.0	34 19.9	18 18.0	22 10.8	64 20.4
50-99	69 13.0	8 9.4	11 13.1	16 19.8	8 12.5	19 12.3	21 11.9	39 16.0	7 10.8	2 5.1	40 16.0	15 8.8	13 13.0	29 14.2	40 12.8
100-249	95 18.0	10 11.8	11 13.1	12 14.8	17 26.6	35 22.7	21 11.9	53 21.8	10 15.4	10 25.6	49 19.6	26 15.2	18 18.0	36 17.6	56 17.9
250-499	46 8.7	3 3.5	2 2.4	7 8.6	7 10.9	21 13.6	4 2.3	23 9.5	13 20.0	6 15.4	27 10.8	14 8.2	5 5.0	24 11.8	21 6.7
500 OR MORE	30 5.7	1 1.2	3 3.6	5 6.2	1 1.6	14 9.1	5 2.8	7 2.9	11 16.9	7 17.9	16 6.4	11 6.4	3 3.0	23 11.3	7 2.2
NOT REPORTED	28 5.3	1 1.2	2 2.4	4 4.9	4 6.3	11 7.1	8 4.5	13 5.3	2 3.1	5 12.8	19 7.6	5 2.9	3 3.0	9 4.4	18 5.8
MEAN (INCLUDING NONE)	118	55	77	112	106	178	64	105	228	279	136	116	83	171	84
MEDIAN (INCLUDING NONE)	47	17	28	56	69	97	25	59	145	190	71	35	35	76	39

TABLE- A4
SECTION- 1 QUESTION- 5

NUMBER OF LINKED PC'S SERVED BY INFOCENTER
-- CURRENT --

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION			YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORP-ORATE HEAD-QUAR-TERS	DIVI-SION SUB-SID-IARY/ BR-ANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARL-IER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529	85	84	81	64	154	177	243	65	39	250	171	100	204	313
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
NONE	201	40	42	28	23	49	72	97	20	10	86	79	35	70	126
	38.0	47.1	50.0	34.6	35.9	31.8	40.7	39.9	30.8	25.6	34.4	46.2	35.0	34.3	40.3
1-4	74	15	14	11	8	13	34	32	5	2	31	20	21	22	51
	14.0	17.6	16.7	13.6	12.5	8.4	19.2	13.2	7.7	5.1	12.4	11.7	21.0	10.8	16.3
5-9	30	5	5	6	5	6	12	12	6		12	8	10	10	20
	5.7	5.9	6.0	7.4	7.8	3.9	6.8	4.9	9.2		4.8	4.7	10.0	4.9	6.4
10-19	50	7	5	6	10	18	20	22	3	5	24	14	10	18	30
	9.5	8.2	6.0	7.4	15.6	11.7	11.3	9.1	4.6	12.8	9.6	8.2	10.0	8.8	9.6
20-49	53	9	6	11	5	16	16	26	8	3	29	16	8	18	35
	10.0	10.6	7.1	13.6	7.8	10.4	9.0	10.7	12.3	7.7	11.6	9.4	8.0	8.8	11.2
50-99	32	4	4	7	5	10	6	19	6	1	17	9	6	18	13
	6.0	4.7	4.8	8.6	7.8	6.5	3.4	7.8	9.2	2.6	6.8	5.3	6.0	8.8	4.2
100-249	34	2	5	5	3	15	6	14	6	6	17	9	6	23	11
	6.4	2.4	6.0	6.2	4.7	9.7	3.4	5.8	9.2	15.4	6.8	5.3	6.0	11.3	3.5
250-499	20	1	1	1	1	12	2	8	5	5	12	7	1	12	7
	3.8	1.2	1.2	1.2	1.6	7.8	1.1	3.3	7.7	12.8	4.8	4.1	1.0	5.9	2.2
500 OR MORE	7	1		2		4	1		4	2	3	4		4	2
	1.3	1.2		2.5		2.6	.6		6.2	5.1	1.2	2.3		2.0	.6
NOT REPORTED	28	1	2	4	4	11	8	13	2	5	19	5	3	9	18
	5.3	1.2	2.4	4.9	6.3	7.1	4.5	5.3	3.1	12.8	7.6	2.9	3.0	4.4	5.8
MEAN (INCLUDING NONE)	41	26	19	45	24	67	22	29	97	112	45	48	20	60	26
MEDIAN (INCLUDING NONE)	4	2	1	5	5	12	3	3	13	20	5	2	4	8	3

TABLE- A5
SECTION- 1 QUESTION- 5

NUMBER OF TERMINALS SERVED BY INFOCENTER
-- CURRENT --

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION			YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORP-ORATE HEAD-QUAR-TERS	DIVI-SION SUB-SID-IARY/ BR-ANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARL-IER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529	85	84	81	64	154	177	243	65	39	250	171	100	204	313
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
NONE	131	23	16	23	21	27	49	51	15	13	65	36	29	24	105
	24.8	27.1	19.0	28.4	32.8	17.5	27.7	21.0	23.1	33.3	26.0	21.1	29.0	11.8	33.5
1-4	27	5	6	5	3	6	12	14	1		9	14	3	5	22
	5.1	5.9	7.1	6.2	4.7	3.9	6.8	5.8	1.5		3.6	8.2	3.0	2.5	7.0
5-9	18	6	4		1	5	10	4	3	1	6	8	4	5	13
	3.4	7.1	4.8		1.6	3.2	5.6	1.6	4.6	2.6	2.4	4.7	4.0	2.5	4.2
10-19	35	7	6	3	3	11	18	13	2	1	11	14	10	18	16
	6.6	8.2	7.1	3.7	4.7	7.1	10.2	5.3	3.1	2.6	4.4	8.2	10.0	8.8	5.1
20-49	60	15	11	11	4	14	27	26	3	3	26	16	17	21	36
	11.3	17.6	13.1	13.6	6.3	9.1	15.3	10.7	4.6	7.7	10.4	9.4	17.0	10.3	11.5
50-99	54	10	11	5	7	15	16	32	3	3	27	17	9	24	28
	10.2	11.8	13.1	6.2	10.9	9.7	9.0	13.2	4.6	7.7	10.8	9.9	9.0	11.8	8.9
100-249	79	7	14	12	12	26	19	40	16	4	29	33	15	45	32
	14.9	8.2	16.7	14.8	18.8	16.9	10.7	16.5	24.6	10.3	11.6	19.3	15.0	22.1	10.2
250-499	58	4	9	14	7	21	13	37	6	2	33	19	6	27	30
	11.0	4.7	10.7	17.3	10.9	13.6	7.3	15.2	9.2	5.1	13.2	11.1	6.0	13.2	9.6
500 OR MORE	39	7	5	4	2	18	5	13	14	7	25	9	4	26	13
	7.4	8.2	6.0	4.9	3.1	11.7	2.8	5.3	21.5	17.9	10.0	5.3	4.0	12.7	4.2
NOT REPORTED	28	1	2	4	4	11	8	13	2	5	19	5	3	9	18
	5.3	1.2	2.4	4.9	6.3	7.1	4.5	5.3	3.1	12.8	7.6	2.9	3.0	4.4	5.8
MEAN (INCLUDING NONE)	130	94	124	123	93	188	68	129	266	210	161	111	83	201	85
MEDIAN (INCLUDING NONE)	40	22	45	42	35	80	18	61	147	40	49	41	25	103	15

NUMBER OF STANDALONE PC'S SERVED BY INFOCENTER
-- PROJECTED ONE YEAR FROM NOW --

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION			YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORPORATE HEAD-QUARTERS	DIVISION SUB-SIDIARY/ BR-ANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARLIER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529	85	84	81	64	154	177	243	65	39	250	171	100	204	313
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
NONE	51	11	10	4	4	19	22	17	3	7	20	24	5	23	25
	9.6	12.9	11.9	4.9	6.3	12.3	12.4	7.0	4.6	17.9	8.0	14.0	5.0	11.3	8.0
1-4	29	9	8	3	2	4	14	12	3		4	14	11	9	20
	5.5	10.6	9.5	3.7	3.1	2.6	7.9	4.9	4.6		1.6	8.2	11.0	4.4	6.4
5-9	24	5	5	5	1	5	11	9	3	1	12	4	8	6	18
	4.5	5.9	6.0	6.2	1.6	3.2	6.2	3.7	4.6	2.6	4.8	2.3	8.0	2.9	5.8
10-19	34	9	9	5	6	1	18	15	1		13	12	9	12	21
	6.4	10.6	10.7	6.2	9.4	.6	10.2	6.2	1.5		5.2	7.0	9.0	5.9	6.7
20-49	76	19	13	9	12	14	37	30	8	1	31	29	16	22	53
	14.4	22.4	15.5	11.1	18.8	9.1	20.9	12.3	12.3	2.6	12.4	17.0	16.0	10.8	16.9
50-99	63	11	12	21	1	10	21	32	7	1	32	18	13	20	42
	11.9	12.9	14.3	25.9	1.6	6.5	11.9	13.2	10.8	2.6	12.8	10.5	13.0	9.8	13.4
100-249	100	9	15	16	19	33	25	65	7	3	56	28	14	40	57
	18.9	10.6	17.9	19.8	29.7	21.4	14.1	26.7	10.8	7.7	22.4	16.4	14.0	19.6	18.2
250-499	45	5	2	6	7	19	6	18	10	10	24	12	8	21	24
	8.5	5.9	2.4	7.4	10.9	12.3	3.4	7.4	15.4	25.6	9.6	7.0	8.0	10.3	7.7
500 OR MORE	46	3	2	7	4	26	6	20	13	7	25	16	5	30	15
	8.7	3.5	2.4	8.6	6.3	16.9	3.4	8.2	20.0	17.9	10.0	9.4	5.0	14.7	4.8
NOT REPORTED	61	4	8	5	8	23	17	25	10	9	33	14	11	21	38
	11.5	4.7	9.5	6.2	12.5	14.9	9.6	10.3	15.4	23.1	13.2	8.2	11.0	10.3	12.1
MEAN (INCLUDING NONE)	149	84	75	153	143	226	80	149	269	306	174	136	114	206	112
MEDIAN (INCLUDING NONE)	66	31	34	79	116	159	32	91	164	300	95	46	43	100	51

NUMBER OF LINKED PC'S SERVED BY INFOCENTER
-- PROJECTED ONE YEAR FROM NOW --

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION			YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORPORATE HEADQUARTERS	DIVISION SUBSIDIARY/BRANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARLIER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529	85	84	81	64	154	177	243	65	39	250	171	100	204	313
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
NONE	121	30	27	13	13	26	53	52	11	4	43	48	30	34	83
	22.9	35.3	32.1	16.0	20.3	16.9	29.9	21.4	16.9	10.3	17.2	28.1	30.0	16.7	26.5
1-4	38	4	11	6	4	6	11	20	5	1	20	9	8	12	26
	7.2	4.7	13.1	7.4	6.3	3.9	6.2	8.2	7.7	2.6	8.0	5.3	8.0	5.9	8.3
5-9	36	11	7	6	2	6	13	18	3	1	10	17	9	14	21
	6.8	12.9	8.3	7.4	3.1	3.9	7.3	7.4	4.6	2.6	4.0	9.9	9.0	6.9	6.7
10-19	46	6	6	9	12	10	22	21	2	1	26	14	6	15	31
	8.7	7.1	7.1	11.1	18.8	6.5	12.4	8.6	3.1	2.6	10.4	8.2	6.0	7.4	9.9
20-49	81	15	10	16	9	25	31	40	6	4	43	24	13	34	45
	15.3	17.6	11.9	19.8	14.1	16.2	17.5	16.5	9.2	10.3	17.2	14.0	13.0	16.7	14.4
50-99	50	4	5	14	9	12	12	30	4	4	24	15	11	19	30
	9.5	4.7	6.0	17.3	14.1	7.8	6.8	12.3	6.2	10.3	9.6	8.8	11.0	9.3	9.6
100-249	45	6	6	7	3	20	8	22	8	5	23	13	7	23	22
	8.5	7.1	7.1	8.6	4.7	13.0	4.5	9.1	12.3	12.8	9.2	7.6	7.0	11.3	7.0
250-499	30	3	2	3	4	15	7	13	6	4	17	9	4	18	11
	5.7	3.5	2.4	3.7	6.3	9.7	4.0	5.3	9.2	10.3	6.8	5.3	4.0	8.8	3.5
500 OR MORE	21	2	2	2		11	3	2	10	6	11	8	1	14	6
	4.0	2.4	2.4	2.5		7.1	1.7	.8	15.4	15.4	4.4	4.7	1.0	6.9	1.9
NOT REPORTED	61	4	8	5	8	23	17	25	10	9	33	14	11	21	38
	11.5	4.7	9.5	6.2	12.5	14.9	9.6	10.3	15.4	23.1	13.2	8.2	11.0	10.3	12.1
MEAN (INCLUDING NONE)	80	50	48	67	48	132	46	52	201	242	92	81	43	120	51
MEDIAN (INCLUDING NONE)	18	8	5	28	18	42	11	19	63	100	27	14	9	35	13

NUMBER OF TERMINALS SERVED BY INFOCENTER
-- PROJECTED ONE YEAR FROM NOW --

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION			YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORP-ORATE HEAD-QUAR-TERS	DIVI-SION SUB-SID-IARY/ BR-ANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARL-IER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529 100.0	85 100.0	84 100.0	81 100.0	64 100.0	154 100.0	177 100.0	243 100.0	65 100.0	39 100.0	250 100.0	171 100.0	100 100.0	204 100.0	313 100.0
NONE	121 22.9	17 20.0	16 19.0	24 29.6	20 31.3	25 16.2	42 23.7	52 21.4	14 21.5	10 25.6	63 25.2	31 18.1	25 25.0	28 13.7	91 29.1
1-4	24 4.5	6 7.1	6 7.1	8 9.9	3 4.7	1 .6	11 6.2	11 4.5	2 3.1		6 2.4	13 7.6	5 5.0	6 2.9	18 5.8
5-9	9 1.7	3 3.5	1 1.2	1 1.2		2 1.3	6 3.4	3 1.2			4 1.6	3 1.8	2 2.0	3 1.5	6 1.9
10-19	33 6.2	9 10.6	7 8.3	1 1.2	2 3.1	9 5.8	17 9.6	11 4.5	2 3.1	2 5.1	10 4.0	15 8.8	8 8.0	15 7.4	18 5.8
20-49	50 9.5	15 17.6	9 10.7	8 9.9	3 4.7	11 7.1	26 14.7	20 8.2	1 1.5	2 5.1	19 7.6	19 11.1	11 11.0	17 8.3	31 9.9
50-99	47 8.9	9 10.6	7 8.3	7 8.6	9 14.1	11 7.1	14 7.9	27 11.1	4 6.2	2 5.1	24 9.6	12 7.0	11 11.0	22 10.8	22 7.0
100-249	87 16.4	11 12.9	16 19.0	9 11.1	8 12.5	34 22.1	26 14.7	41 16.9	15 23.1	5 12.8	35 14.0	34 19.9	16 16.0	45 22.1	40 12.8
250-499	57 10.8	2 2.4	9 10.7	11 13.6	9 14.1	22 14.3	11 6.2	36 14.8	7 10.8	3 7.7	31 12.4	19 11.1	7 7.0	23 11.3	33 10.5
500 OR MORE	40 7.6	9 10.6	5 6.0	7 8.6	2 3.1	16 10.4	7 4.0	17 7.0	10 15.4	6 15.4	25 10.0	11 6.4	4 4.0	24 11.8	16 5.1
NOT REPORTED	61 11.5	4 4.7	8 9.5	5 6.2	8 12.5	23 14.9	17 9.6	25 10.3	10 15.4	9 23.1	33 13.2	14 8.2	11 11.0	21 10.3	38 12.1
MEAN (INCLUDING NONE)	136	108	123	134	104	193	82	140	239	224	164	125	87	189	102
MEDIAN (INCLUDING NONE)	48	32	47	35	50	131	25	72	150	75	65	47	34	103	25

TABLE- A9
SECTION- 3 QUESTION- 1

ADDITIONAL MAINFRAME EXPENDITURES BUDGETED IN 1986 FOR..

NEW MAINFRAME/MINI COMPUTERS

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION			YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORPORATE HEADQUARTERS	DIVISION SUBSIDIARY/ BRANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARLIER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529	85	84	81	64	154	177	243	65	39	250	171	100	204	313
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
NOTHING	198	38	35	36	20	55	74	96	20	8	90	63	43	80	114
	37.4	44.7	41.7	44.4	31.3	35.7	41.8	39.5	30.8	20.5	36.0	36.8	43.0	39.2	36.4
UNDER $10,000	4	2		1		1	1	2		1	1	1	2	3	1
	.8	2.4		1.2		.6	.6	.8		2.6	.4	.6	2.0	1.5	.3
$10,000- $24,999	4	2				2	2	1	1		1	2	1	1	3
	.8	2.4				1.3	1.1	.4	1.5		.4	1.2	1.0	.5	1.0
$25,000- $49,999	5	1			1	3	3	1		1	2	2	1	2	3
	.9	1.2			1.6	1.9	1.7	.4		2.6	.8	1.2	1.0	1.0	1.0
$50,000- $99,999	15	2	5	2	2	2	5	9	1		7	5	3	5	9
	2.8	2.4	6.0	2.5	3.1	1.3	2.8	3.7	1.5		2.8	2.9	3.0	2.5	2.9
$100,000- $199,999	11	3	2	4	1		3	7			3	3	4	4	6
	2.1	3.5	2.4	4.9	1.6		1.7	2.9			1.2	1.8	4.0	2.0	1.9
$200,000- $299,999	11	1	3			6	3	4	2	2	5	4	2	4	6
	2.1	1.2	3.6			3.9	1.7	1.6	3.1	5.1	2.0	2.3	2.0	2.0	1.9
$300,000- $499,999	5	2	2	1			2	3			4		1	3	2
	.9	2.4	2.4	1.2			1.1	1.2			1.6		1.0	1.5	.6
$500,000- $999,999	22	4	5		4	7	7	9	3	3	6	13	3	9	13
	4.2	4.7	6.0		6.3	4.5	4.0	3.7	4.6	7.7	2.4	7.6	3.0	4.4	4.2
$1,000,000 OR MORE	15	1	1	2	3	7	3	6	4	2	11	1	3	9	6
	2.8	1.2	1.2	2.5	4.7	4.5	1.7	2.5	6.2	5.1	4.4	.6	3.0	4.4	1.9
NOT REPORTED	239	29	31	35	33	71	74	105	34	22	120	77	37	84	150
	45.2	34.1	36.9	43.2	51.6	46.1	41.8	43.2	52.3	56.4	48.0	45.0	37.0	41.2	47.9
MEAN (INCLUDING NOTHING)	157	114	130	90	243	211	126	129	285	349	196	130	124	190	137

AMERICAN MANAGEMENT ASSOCIATION
1986 REPORT ON INFORMATION CENTERS

TABLE- A10
SECTION- 3 QUESTION- 1

ADDITIONAL MAINFRAME EXPENDITURES BUDGETED IN 1986 FOR..

UPGRADED OPERATIONAL CAPABILITY FOR EXISTING MAINFRAME/MINIS

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION				
														YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORP-ORATE HEAD-QUAR-TERS	DIVI-SION SUB-SID-IARY/ BR-ANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARL-IER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529 100.0	85 100.0	84 100.0	81 100.0	64 100.0	154 100.0	177 100.0	243 100.0	65 100.0	39 100.0	250 100.0	171 100.0	100 100.0	204 100.0	313 100.0
NOTHING	182 34.4	28 32.9	30 35.7	31 38.3	21 32.8	56 36.4	60 33.9	85 35.0	24 36.9	13 33.3	89 35.6	54 31.6	39 39.0	77 37.7	101 32.3
UNDER $10,000	11 2.1	5 5.9		1 1.2	2 3.1	2 1.3	7 4.0	3 1.2	1 1.5		5 2.0	4 2.3	2 2.0	2 1.0	9 2.9
$10,000- $24,999	15 2.8	3 3.5	5 6.0	2 2.5	1 1.6	2 1.3	5 2.8	9 3.7			3 1.2	6 3.5	5 5.0	9 4.4	6 1.9
$25,000- $49,999	14 2.6	5 5.9	3 3.6	2 2.5	1 1.6	3 1.9	7 4.0	6 2.5	1 1.5		5 2.0	4 2.3	4 4.0	5 2.5	9 2.9
$50,000- $99,999	20 3.8	4 4.7	4 4.8	2 2.5	2 3.1	7 4.5	7 4.0	10 4.1	1 1.5	2 5.1	8 3.2	8 4.7	4 4.0	6 2.9	11 3.5
$100,000- $199,999	17 3.2	3 3.5	4 4.8	6 7.4	2 3.1	2 1.3	3 1.7	13 5.3	1 1.5		6 2.4	8 4.7	3 3.0	8 3.9	9 2.9
$200,000- $299,999	7 1.3	1 1.2	3 3.6		1 1.6	2 1.3	4 2.3	3 1.2			1 .4	5 2.9	1 1.0	1 .5	6 1.9
$300,000- $499,999	2 .4	2 2.4					1 .6	1 .4					2 2.0	1 .5	1 .3
$500,000- $999,999	17 3.2	5 5.9	4 4.8	2 2.5	1 1.6	4 2.6	7 4.0	6 2.5	2 3.1	2 5.1	9 3.6	4 2.3	3 3.0	9 4.4	8 2.6
$1,000,000 OR MORE	5 .9					5 3.2	2 1.1	2 .8	1 1.5		4 1.6	1 .6		2 1.0	3 1.0
NOT REPORTED	239 45.2	29 34.1	31 36.9	35 43.2	33 51.6	71 46.1	74 41.8	105 43.2	34 52.3	22 56.4	120 48.0	77 45.0	37 37.0	84 41.2	150 47.9
MEAN (INCLUDING NOTHING)	88	83	85	51	46	146	100	78	87	112	115	68	58	94	87

ADDITIONAL MAINFRAME EXPENDITURES BUDGETED IN 1986 FOR..

ADDITIONAL TERMINALS/WORK STATIONS

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION			YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORP-ORATE HEAD-QUAR-TERS	DIVI-SION SUB-SID-IARY/ BR-ANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARL-IER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529	85	84	81	64	154	177	243	65	39	250	171	100	204	313
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
NOTHING	126	28	16	21	14	36	44	58	16	8	59	40	27	48	76
	23.8	32.9	19.0	25.9	21.9	23.4	24.9	23.9	24.6	20.5	23.6	23.4	27.0	23.5	24.3
UNDER $10,000	26	7	5	5	1	7	13	12	1		8	7	11	9	17
	4.9	8.2	6.0	6.2	1.6	4.5	7.3	4.9	1.5		3.2	4.1	11.0	4.4	5.4
$10,000- $24,999	48	5	15	6	5	12	10	33	3	1	21	15	10	21	25
	9.1	5.9	17.9	7.4	7.8	7.8	5.6	13.6	4.6	2.6	8.4	8.8	10.0	10.3	8.0
$25,000- $49,999	25	6	5	5	3	4	13	7	3	2	11	7	7	13	10
	4.7	7.1	6.0	6.2	4.7	2.6	7.3	2.9	4.6	5.1	4.4	4.1	7.0	6.4	3.2
$50,000- $99,999	28	5	7	5	2	8	9	16	3		13	12	3	11	16
	5.3	5.9	8.3	6.2	3.1	5.2	5.1	6.6	4.6		5.2	7.0	3.0	5.4	5.1
$100,000- $199,999	15	2	2	1	3	7	8	5		2	7	6	2	6	9
	2.8	2.4	2.4	1.2	4.7	4.5	4.5	2.1		5.1	2.8	3.5	2.0	2.9	2.9
$200,000- $299,999	9	1	1		3	4	3	2	3	1	3	5	1	4	5
	1.7	1.2	1.2		4.7	2.6	1.7	.8	4.6	2.6	1.2	2.9	1.0	2.0	1.6
$300,000- $499,999	6	1		2		3	2	2		2	3	2	1	3	3
	1.1	1.2		2.5		1.9	1.1	.8		5.1	1.2	1.2	1.0	1.5	1.0
$500,000- $999,999	3	1	1	1			1	1	1		1		1	3	
	.6	1.2	1.2	1.2			.6	.4	1.5		.4		1.0	1.5	
$1,000,000 OR MORE	4		1			2		2	1	1	4			2	2
	.8		1.2			1.3		.8	1.5	2.6	1.6			1.0	.6
NOT REPORTED	239	29	31	35	33	71	74	105	34	22	120	77	37	84	150
	45.2	34.1	36.9	43.2	51.6	46.1	41.8	43.2	52.3	56.4	48.0	45.0	37.0	41.2	47.9
MEAN (INCLUDING NOTHING)	58	33	64	40	43	81	38	52	96	160	81	40	31	71	50

ADDITIONAL MAINFRAME EXPENDITURES BUDGETED IN 1986 FOR..

OPERATIONAL SOFTWARE

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION			YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORP-ORATE HEAD-QUAR-TERS	DIVI-SION SUB-SID-IARY/ BR-ANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARL-IER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529 100.0	85 100.0	84 100.0	81 100.0	64 100.0	154 100.0	177 100.0	243 100.0	65 100.0	39 100.0	250 100.0	171 100.0	100 100.0	204 100.0	313 100.0
NOTHING	163 30.8	28 32.9	28 33.3	28 34.6	18 28.1	50 32.5	57 32.2	79 32.5	19 29.2	8 20.5	77 30.8	53 31.0	33 33.0	65 31.9	96 30.7
UNDER $10,000	14 2.6	6 7.1	3 3.6		3 4.7	1 .6	8 4.5	6 2.5			5 2.0	4 2.3	5 5.0	7 3.4	6 1.9
$10,000- $24,999	36 6.8	10 11.8	8 9.5	7 8.6	2 3.1	6 3.9	12 6.8	18 7.4	4 6.2	2 5.1	12 4.8	14 8.2	9 9.0	12 5.9	24 7.7
$25,000- $49,999	24 4.5	2 2.4	6 7.1	4 4.9	4 6.3	5 3.2	6 3.4	14 5.8	3 4.6		9 3.6	9 5.3	5 5.0	10 4.9	12 3.8
$50,000- $99,999	23 4.3	3 3.5	3 3.6	5 6.2		10 6.5	8 4.5	11 4.5	2 3.1	2 5.1	12 4.8	7 4.1	4 4.0	8 3.9	13 4.2
$100,000- $199,999	13 2.5	5 5.9	1 1.2	1 1.2	1 1.6	5 3.2	5 2.8	5 2.1	1 1.5	2 5.1	6 2.4	4 2.3	3 3.0	11 5.4	2 .6
$200,000- $299,999	7 1.3	1 1.2	3 3.6	1 1.2	1 1.6		3 1.7	3 1.2		1 2.6	3 1.2	1 .6	3 3.0	3 1.5	4 1.3
$300,000- $499,999	4 .8	1 1.2			1 1.6	2 1.3	4 2.3				1 .4	2 1.2	1 1.0	1 .5	3 1.0
$500,000- $999,999	2 .4		1 1.2			1 .6			1 1.5	1 2.6	1 .4			1 .5	1 .3
$1,000,000 OR MORE	4 .8				1 1.6	3 1.9		2 .8	1 1.5	1 2.6	4 1.6			2 1.0	2 .6
NOT REPORTED	239 45.2	29 34.1	31 36.9	35 43.2	33 51.6	71 46.1	74 41.8	105 43.2	34 52.3	22 56.4	120 48.0	77 45.0	37 37.0	84 41.2	150 47.9
MEAN (INCLUDING NOTHING)	50	28	43	17	74	86	34	41	93	149	73	23	29	60	44

ADDITIONAL MAINFRAME EXPENDITURES BUDGETED IN 1986 FOR..

APPLICATIONS SOFTWARE

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION			YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORP-ORATE HEAD-QUAR-TERS	DIVI-SION SUB-SID-IARY/ BR-ANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARL-IER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529	85	84	81	64	154	177	243	65	39	250	171	100	204	313
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
NOTHING	135	22	20	26	13	46	47	58	22	8	67	41	27	55	77
	25.5	25.9	23.8	32.1	20.3	29.9	26.6	23.9	33.8	20.5	26.8	24.0	27.0	27.0	24.6
UNDER $10,000	14	4	5		1	3	4	9	1		4	6	4	7	6
	2.6	4.7	6.0		1.6	1.9	2.3	3.7	1.5		1.6	3.5	4.0	3.4	1.9
$10,000- $24,999	36	10	10	4	2	7	13	19	2	2	12	15	9	18	18
	6.8	11.8	11.9	4.9	3.1	4.5	7.3	7.8	3.1	5.1	4.8	8.8	9.0	8.8	5.8
$25,000- $49,999	24	4	3	2	7	6	12	11			10	6	7	6	18
	4.5	4.7	3.6	2.5	10.9	3.9	6.8	4.5			4.0	3.5	7.0	2.9	5.8
$50,000- $99,999	35	8	5	9	3	5	11	19	3	2	15	10	9	16	18
	6.6	9.4	6.0	11.1	4.7	3.2	6.2	7.8	4.6	5.1	6.0	5.8	9.0	7.8	5.8
$100,000- $199,999	16	3	3	1	1	6	8	5		3	9	7		9	6
	3.0	3.5	3.6	1.2	1.6	3.9	4.5	2.1		7.7	3.6	4.1		4.4	1.9
$200,000- $299,999	11	2	3	1	1	4	3	7	1		2	7	2	3	7
	2.1	2.4	3.6	1.2	1.6	2.6	1.7	2.9	1.5		.8	4.1	2.0	1.5	2.2
$300,000- $499,999	8	2	2		1	3	2	5		1	4	1	3	3	5
	1.5	2.4	2.4		1.6	1.9	1.1	2.1		2.6	1.6	.6	3.0	1.5	1.6
$500,000- $999,999	9	1	2	2	1	3	2	4	2	1	6	1	1	3	6
	1.7	1.2	2.4	2.5	1.6	1.9	1.1	1.6	3.1	2.6	2.4	.6	1.0	1.5	1.9
$1,000,000 OR MORE	2			1	1		1	1			1		1		2
	.4			1.2	1.6		.6	.4			.4		1.0		.6
NOT REPORTED	239	29	31	35	33	71	74	105	34	22	120	77	37	84	150
	45.2	34.1	36.9	43.2	51.6	46.1	41.8	43.2	52.3	56.4	48.0	45.0	37.0	41.2	47.9
MEAN (INCLUDING NOTHING)	66	54	60	87	117	57	61	72	46	81	71	49	75	52	77

ADDITIONAL MAINFRAME EXPENDITURES BUDGETED IN 1986 FOR..

TELECOMMUNICATIONS

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION			YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORP-ORATE HEAD-QUAR-TERS	DIVI-SION SUB-SID-IARY/ BR-ANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARL-IER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529	85	84	81	64	154	177	243	65	39	250	171	100	204	313
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
NOTHING	164	30	32	29	16	46	61	78	20	5	72	54	38	59	101
	31.0	35.3	38.1	35.8	25.0	29.9	34.5	32.1	30.8	12.8	28.8	31.6	38.0	28.9	32.3
UNDER $10,000	23	8	5	1	4	2	10	11	1	1	7	8	7	10	13
	4.3	9.4	6.0	1.2	6.3	1.3	5.6	4.5	1.5	2.6	2.8	4.7	7.0	4.9	4.2
$10,000- $24,999	29	6	3	8	5	5	10	12	3	3	14	8	6	16	13
	5.5	7.1	3.6	9.9	7.8	3.2	5.6	4.9	4.6	7.7	5.6	4.7	6.0	7.8	4.2
$25,000- $49,999	14	3	2	3	1	4	3	8	2	1	4	9	1	8	3
	2.6	3.5	2.4	3.7	1.6	2.6	1.7	3.3	3.1	2.6	1.6	5.3	1.0	3.9	1.0
$50,000- $99,999	25	4	7	1	2	8	8	13	1	3	12	8	5	11	14
	4.7	4.7	8.3	1.2	3.1	5.2	4.5	5.3	1.5	7.7	4.8	4.7	5.0	5.4	4.5
$100,000- $199,999	17	3		2	1	10	5	8	2	2	10	4	3	7	10
	3.2	3.5		2.5	1.6	6.5	2.8	3.3	3.1	5.1	4.0	2.3	3.0	3.4	3.2
$200,000- $299,999	3		2		1		2			1	1	1	1	1	2
	.6		2.4		1.6		1.1			2.6	.4	.6	1.0	.5	.6
$300,000- $499,999	7	1	1	2		3	3	3		1	5		2	3	4
	1.3	1.2	1.2	2.5		1.9	1.7	1.2		2.6	2.0		2.0	1.5	1.3
$500,000- $999,999	4	1	1		1	1		3	1		1	2		3	1
	.8	1.2	1.2		1.6	.6		1.2	1.5		.4	1.2		1.5	.3
$1,000,000 OR MORE	4					4	1	2	1		4			2	2
	.8					2.6	.6	.8	1.5		1.6			1.0	.6
NOT REPORTED	239	29	31	35	33	71	74	105	34	22	120	77	37	84	150
	45.2	34.1	36.9	43.2	51.6	46.1	41.8	43.2	52.3	56.4	48.0	45.0	37.0	41.2	47.9
MEAN (INCLUDING NOTHING)	55	28	40	24	35	118	42	58	84	57	81	31	27	68	47

TABLE- A15
SECTION- 3 QUESTION- 1

ADDITIONAL MICROCOMPUTER EXPENDITURES BUDGETED IN 1986 FOR..

NEW MICROCOMPUTERS

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION			YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORP-ORATE HEAD-QUAR-TERS	DIVI-SION SUB-SID-IARY/ BR-ANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARL-IER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529	85	84	81	64	154	177	243	65	39	250	171	100	204	313
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
NOTHING	18	9	6		1	2	12	5		1	7	9	2	6	10
	3.4	10.6	7.1		1.6	1.3	6.8	2.1		2.6	2.8	5.3	2.0	2.9	3.2
UNDER $10,000	19	8	4	3	1	2	6	11	1		3	5	11	7	12
	3.6	9.4	4.8	3.7	1.6	1.3	3.4	4.5	1.5		1.2	2.9	11.0	3.4	3.8
$10,000- $24,999	44	10	7	6	8	10	23	13	4	3	17	16	11	15	28
	8.3	11.8	8.3	7.4	12.5	6.5	13.0	5.3	6.2	7.7	6.8	9.4	11.0	7.4	8.9
$25,000- $49,999	30	5	9	5	2	5	13	13	4		12	11	6	14	16
	5.7	5.9	10.7	6.2	3.1	3.2	7.3	5.3	6.2		4.8	6.4	6.0	6.9	5.1
$50,000- $99,999	57	15	9	11	5	11	22	30	1	3	22	23	11	17	39
	10.8	17.6	10.7	13.6	7.8	7.1	12.4	12.3	1.5	7.7	8.8	13.5	11.0	8.3	12.5
$100,000- $199,999	52	6	13	9	12	10	17	32	3		29	15	8	16	34
	9.8	7.1	15.5	11.1	18.8	6.5	9.6	13.2	4.6		11.6	8.8	8.0	7.8	10.9
$200,000- $299,999	32	1	4	8	7	12	12	16	2	2	18	8	6	8	24
	6.0	1.2	4.8	9.9	10.9	7.8	6.8	6.6	3.1	5.1	7.2	4.7	6.0	3.9	7.7
$300,000- $499,999	22	1	1	5	4	7	2	15	2	3	12	7	3	9	13
	4.2	1.2	1.2	6.2	6.3	4.5	1.1	6.2	3.1	7.7	4.8	4.1	3.0	4.4	4.2
$500,000- $999,999	36	4	3	7	3	19	5	15	11	5	17	12	6	15	20
	6.8	4.7	3.6	8.6	4.7	12.3	2.8	6.2	16.9	12.8	6.8	7.0	6.0	7.4	6.4
$1,000,000 OR MORE	13		1	2	1	7	1	5	5	2	8	4	1	6	5
	2.5		1.2	2.5	1.6	4.5	.6	2.1	7.7	5.1	3.2	2.3	1.0	2.9	1.6
NOT REPORTED	206	26	27	25	20	69	64	88	32	20	105	61	35	91	112
	38.9	30.6	32.1	30.9	31.3	44.8	36.2	36.2	49.2	51.3	42.0	35.7	35.0	44.6	35.8
MEAN (INCLUDING NOTHING)	221	89	133	242	186	374	112	215	499	479	259	206	164	245	197

ADDITIONAL MICROCOMPUTER EXPENDITURES BUDGETED IN 1986 FOR..

PERIPHERALS

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION			YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORP-ORATE HEAD-QUAR-TERS	DIVI-SION SUB-SID-IARY/ BR-ANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARL-IER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529 100.0	85 100.0	84 100.0	81 100.0	64 100.0	154 100.0	177 100.0	243 100.0	65 100.0	39 100.0	250 100.0	171 100.0	100 100.0	204 100.0	313 100.0
NOTHING	99 18.7	18 21.2	15 17.9	19 23.5	13 20.3	28 18.2	31 17.5	48 19.8	10 15.4	9 23.1	45 18.0	33 19.3	20 20.0	29 14.2	68 21.7
UNDER $2,000	9 1.7	3 3.5	2 2.4	1 1.2	1 1.6		6 3.4	3 1.2				5 2.9	4 4.0	4 2.0	4 1.3
$2,000- $2,999	6 1.1	3 3.5			2 3.1	1 .6	2 1.1	3 1.2	1 1.5		2 .8	2 1.2	2 2.0	3 1.5	3 1.0
$3,000- $3,999	6 1.1	2 2.4	1 1.2	2 2.5		1 .6	2 1.1	2 .8	1 1.5	1 2.6	1 .4	3 1.8	2 2.0	2 1.0	4 1.3
$4,000- $4,999	4 .8	2 2.4	1 1.2	1 1.2			3 1.7	1 .4				1 .6	3 3.0		4 1.3
$5,000- $9,999	30 5.7	7 8.2	8 9.5	2 2.5	5 7.8	5 3.2	18 10.2	9 3.7	2 3.1	1 2.6	14 5.6	6 3.5	10 10.0	12 5.9	18 5.8
$10,000- $19,999	43 8.1	8 9.4	9 10.7	6 7.4	5 7.8	13 8.4	15 8.5	23 9.5	2 3.1	2 5.1	21 8.4	13 7.6	9 9.0	16 7.8	26 8.3
$20,000- $29,999	32 6.0	5 5.9	9 10.7	5 6.2	6 9.4	5 3.2	13 7.3	17 7.0	1 1.5	1 2.6	13 5.2	14 8.2	4 4.0	10 4.9	20 6.4
$30,000- $49,999	15 2.8	3 3.5	2 2.4	4 4.9	2 3.1	2 1.3	4 2.3	9 3.7	2 3.1		8 3.2	5 2.9	2 2.0	6 2.9	8 2.6
$50,000 OR MORE	79 14.9	8 9.4	10 11.9	16 19.8	10 15.6	30 19.5	19 10.7	40 16.5	14 21.5	5 12.8	41 16.4	28 16.4	9 9.0	31 15.2	46 14.7
NOT REPORTED	206 38.9	26 30.6	27 32.1	25 30.9	20 31.3	69 44.8	64 36.2	88 36.2	32 49.2	20 51.3	105 42.0	61 35.7	35 35.0	91 44.6	112 35.8
MEAN (INCLUDING NOTHING)	33.3	20.9	26.4	37.6	27.8	46.5	23.9	35.1	58.1	34.3	39.4	34.0	19.1	40.3	29.5

ADDITIONAL MICROCOMPUTER EXPENDITURES BUDGETED IN 1986 FOR.. MICRO SOFTWARE FOR DATABASE MANAGEMENT

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION			YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORP-ORATE HEAD-QUAR-TERS	DIVI-SION SUB-SID-IARY/ BR-ANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARL-IER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529	85	84	81	64	154	177	243	65	39	250	171	100	204	313
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
NOTHING	83	25	15	16	10	15	42	30	4	6	32	27	23	28	52
	15.7	29.4	17.9	19.8	15.6	9.7	23.7	12.3	6.2	15.4	12.8	15.8	23.0	13.7	16.6
UNDER $2,000	38	10	9	4	5	6	15	21	1		14	14	10	13	25
	7.2	11.8	10.7	4.9	7.8	3.9	8.5	8.6	1.5		5.6	8.2	10.0	6.4	8.0
$2,000- $2,999	43	8	7	5	8	10	15	23	4	1	17	16	10	11	32
	8.1	9.4	8.3	6.2	12.5	6.5	8.5	9.5	6.2	2.6	6.8	9.4	10.0	5.4	10.2
$3,000- $3,999	16	1	4	1	4	4	5	9	1	1	10	4	2	4	10
	3.0	1.2	4.8	1.2	6.3	2.6	2.8	3.7	1.5	2.6	4.0	2.3	2.0	2.0	3.2
$4,000- $4,999	5			1		4	1	3		1	5			1	4
	.9			1.2		2.6	.6	1.2		2.6	2.0			.5	1.3
$5,000- $9,999	37	8	8	9	3	8	13	18	3	3	14	14	8	15	21
	7.0	9.4	9.5	11.1	4.7	5.2	7.3	7.4	4.6	7.7	5.6	8.2	8.0	7.4	6.7
$10,000- $19,999	51	1	12	9	8	19	12	25	12	2	29	17	5	18	32
	9.6	1.2	14.3	11.1	12.5	12.3	6.8	10.3	18.5	5.1	11.6	9.9	5.0	8.8	10.2
$20,000- $29,999	20			5	4	8	3	11	3	2	11	6	2	10	10
	3.8			6.2	6.3	5.2	1.7	4.5	4.6	5.1	4.4	3.5	2.0	4.9	3.2
$30,000- $49,999	9	3	1			4	2	4	2	1	2	4	3	3	6
	1.7	3.5	1.2			2.6	1.1	1.6	3.1	2.6	.8	2.3	3.0	1.5	1.9
$50,000 OR MORE	21	3	1	6	2	7	5	11	3	2	11	8	2	10	9
	4.0	3.5	1.2	7.4	3.1	4.5	2.8	4.5	4.6	5.1	4.4	4.7	2.0	4.9	2.9
NOT REPORTED	206	26	27	25	20	69	64	88	32	20	105	61	35	91	112
	38.9	30.6	32.1	30.9	31.3	44.8	36.2	36.2	49.2	51.3	42.0	35.7	35.0	44.6	35.8
MEAN (INCLUDING NOTHING)	13.0	8.4	5.6	18.4	12.1	17.3	9.6	13.4	18.1	22.3	15.3	13.5	7.4	16.9	10.3

TABLE- A18
SECTION- 3 QUESTION- 1

ADDITIONAL MICROCOMPUTER EXPENDITURES BUDGETED IN 1986 FOR..
MICRO SOFTWARE FOR SPREADSHEETS

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION			YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORP-ORATE HEAD-QUAR-TERS	DIVI-SION SUB-SID-IARY/ BR-ANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARL-IER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529	85	84	81	64	154	177	243	65	39	250	171	100	204	313
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
NOTHING	86	25	14	11	13	20	40	31	7	7	31	31	23	27	55
	16.3	29.4	16.7	13.6	20.3	13.0	22.6	12.8	10.8	17.9	12.4	18.1	23.0	13.2	17.6
UNDER $2,000	31	8	8	6	3	4	15	13	1	1	13	10	8	12	19
	5.9	9.4	9.5	7.4	4.7	2.6	8.5	5.3	1.5	2.6	5.2	5.8	8.0	5.9	6.1
$2,000- $2,999	22	8	4	1		5	10	10	1	1	10	6	6	5	17
	4.2	9.4	4.8	1.2		3.2	5.6	4.1	1.5	2.6	4.0	3.5	6.0	2.5	5.4
$3,000- $3,999	17	4	2	3	3	4	8	7	1	1	10	3	4	4	13
	3.2	4.7	2.4	3.7	4.7	2.6	4.5	2.9	1.5	2.6	4.0	1.8	4.0	2.0	4.2
$4,000- $4,999	14	3	2	3	1	5	4	8	1	1	8	4	2	6	8
	2.6	3.5	2.4	3.7	1.6	3.2	2.3	3.3	1.5	2.6	3.2	2.3	2.0	2.9	2.6
$5,000- $9,999	46	3	7	12	8	11	11	28	5	2	22	16	8	17	28
	8.7	3.5	8.3	14.8	12.5	7.1	6.2	11.5	7.7	5.1	8.8	9.4	8.0	8.3	8.9
$10,000- $19;999	52	2	14	9	10	13	18	26	5	2	25	18	7	14	36
	9.8	2.4	16.7	11.1	15.6	8.4	10.2	10.7	7.7	5.1	10.0	10.5	7.0	6.9	11.5
$20,000- $29,999	18	2	5	3	4	4	1	14	2	1	6	8	4	6	10
	3.4	2.4	6.0	3.7	6.3	2.6	.6	5.8	3.1	2.6	2.4	4.7	4.0	2.9	3.2
$30,000- $49,999	10	2		3	1	3	2	5	3		7	2	1	5	5
	1.9	2.4		3.7	1.6	1.9	1.1	2.1	4.6		2.8	1.2	1.0	2.5	1.6
$50,000 OR MORE	27	2	1	5	1	16	4	13	7	3	13	12	2	17	10
	5.1	2.4	1.2	6.2	1.6	10.4	2.3	5.3	10.8	7.7	5.2	7.0	2.0	8.3	3.2
NOT REPORTED	206	26	27	25	20	69	64	88	32	20	105	61	35	91	112
	38.9	30.6	32.1	30.9	31.3	44.8	36.2	36.2	49.2	51.3	42.0	35.7	35.0	44.6	35.8
MEAN (INCLUDING NOTHING)	13.6	6.4	7.6	15.0	8.0	23.6	7.6	14.9	23.7	22.2	14.5	17.0	5.9	18.9	10.8

ADDITIONAL MICROCOMPUTER EXPENDITURES BUDGETED IN 1986 FOR..
MICRO SOFTWARE FOR FINANCE/ACCOUNTING

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION			YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORP-ORATE HEAD-QUAR-TERS	DIVI-SION SUB-SID-IARY/ BR-ANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARL-IER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529	85	84	81	64	154	177	243	65	39	250	171	100	204	313
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
NOTHING	242	49	42	42	33	60	89	114	23	14	106	82	52	77	157
	45.7	57.6	50.0	51.9	51.6	39.0	50.3	46.9	35.4	35.9	42.4	48.0	52.0	37.7	50.2
UNDER $2,000	27	4	4	5	5	6	8	15	3	1	14	9	4	12	15
	5.1	4.7	4.8	6.2	7.8	3.9	4.5	6.2	4.6	2.6	5.6	5.3	4.0	5.9	4.8
$2,000- $2,999	13	1	2	4	2	3	4	5	2	2	4	6	3	4	9
	2.5	1.2	2.4	4.9	3.1	1.9	2.3	2.1	3.1	5.1	1.6	3.5	3.0	2.0	2.9
$3,000- $3,999	5	1		1	2	1	1	3		1	2	1	2	4	1
	.9	1.2		1.2	3.1	.6	.6	1.2		2.6	.8	.6	2.0	2.0	.3
$4,000- $4,999	2		1			1			1	1	2			1	1
	.4		1.2			.6			1.5	2.6	.8			.5	.3
$5,000- $9,999	16	2	5	1	2	5	5	10	1		9	4	3	5	11
	3.0	2.4	6.0	1.2	3.1	3.2	2.8	4.1	1.5		3.6	2.3	3.0	2.5	3.5
$10,000- $19,999	14	1	2	3		7	4	7	2		6	6	1	7	7
	2.6	1.2	2.4	3.7		4.5	2.3	2.9	3.1		2.4	3.5	1.0	3.4	2.2
$20,000- $29,999	1	1					1					1			
	.2	1.2					.6					.6			
$30,000- $49,999															
$50,000 OR MORE	3		1			2	1	1	1		2	1		3	
	.6		1.2			1.3	.6	.4	1.5		.8	.6		1.5	
NOT REPORTED	206	26	27	25	20	69	64	88	32	20	105	61	35	91	112
	38.9	30.6	32.1	30.9	31.3	44.8	36.2	36.2	49.2	51.3	42.0	35.7	35.0	44.6	35.8
MEAN (INCLUDING NOTHING)	1.6	1.0	1.9	1.1	.6	2.6	1.5	1.4	2.6	.6	1.8	1.7	.7	2.7	.9

ADDITIONAL MICROCOMPUTER EXPENDITURES BUDGETED IN 1986 FOR.. MICRO SOFTWARE FOR PROJECT MANAGEMENT

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION			YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORP-ORATE HEAD-QUAR-TERS	DIVI-SION SUB-SID-IARY/ BR-ANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARL-IER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529 100.0	85 100.0	84 100.0	81 100.0	64 100.0	154 100.0	177 100.0	243 100.0	65 100.0	39 100.0	250 100.0	171 100.0	100 100.0	204 100.0	313 100.0
NOTHING	172 32.5	40 47.1	29 34.5	25 30.9	24 37.5	43 27.9	72 40.7	68 28.0	18 27.7	12 30.8	80 32.0	51 29.8	40 40.0	59 28.9	110 35.1
UNDER $2,000	48 9.1	7 8.2	10 11.9	8 9.9	5 7.8	12 7.8	15 8.5	27 11.1	5 7.7	1 2.6	19 7.6	14 8.2	14 14.0	13 6.4	34 10.9
$2,000- $2,999	29 5.5	4 4.7	7 8.3	7 8.6	4 6.3	6 3.9	11 6.2	15 6.2	3 4.6		13 5.2	10 5.8	6 6.0	12 5.9	16 5.1
$3,000- $3,999	11 2.1		3 3.6	4 4.9	1 1.6	3 1.9	1 .6	7 2.9	2 3.1	1 2.6	7 2.8	4 2.3		4 2.0	7 2.2
$4,000- $4,999	6 1.1			3 3.7		2 1.3		5 2.1			1 .4	3 1.8	1 1.0	1 .5	5 1.6
$5,000- $9,999	28 5.3	2 2.4	5 6.0	3 3.7	6 9.4	11 7.1	6 3.4	17 7.0	2 3.1	3 7.7	16 6.4	10 5.8	2 2.0	9 4.4	17 5.4
$10,000- $19,999	20 3.8	2 2.4	3 3.6	6 7.4	4 6.3	4 2.6	4 2.3	12 4.9	3 4.6	1 2.6	5 2.0	13 7.6	2 2.0	9 4.4	10 3.2
$20,000- $29,999	2 .4	1 1.2					1 .6	1 .4			1 .4	1 .6		2 1.0	
$30,000- $49,999	1 .2	1 1.2					1 .6				1 .4				1 .3
$50,000 OR MORE	6 1.1	2 2.4				4 2.6	2 1.1	3 1.2		1 2.6	2 .8	4 2.3		4 2.0	1 .3
NOT REPORTED	206 38.9	26 30.6	27 32.1	25 30.9	20 31.3	69 44.8	64 36.2	88 36.2	32 49.2	20 51.3	105 42.0	61 35.7	35 35.0	91 44.6	112 35.8
MEAN (INCLUDING NOTHING)	3.4	3.3	1.6	2.2	2.1	6.3	2.3	3.8	1.7	9.5	3.1	5.2	.9	5.6	1.9

ADDITIONAL MICROCOMPUTER EXPENDITURES BUDGETED IN 1986 FOR..
MICRO SOFTWARE FOR GRAPHICS

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION			YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORP-ORATE HEAD-QUAR-TERS	DIVI-SION SUB-SID-IARY/ BR-ANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARL-IER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529	85	84	81	64	154	177	243	65	39	250	171	100	204	313
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
NOTHING	138	35	23	26	16	32	59	58	11	8	52	47	38	41	93
	26.1	41.2	27.4	32.1	25.0	20.8	33.3	23.9	16.9	20.5	20.8	27.5	38.0	20.1	29.7
UNDER $2,000	46	9	14	3	6	7	20	22	1	3	22	16	8	20	25
	8.7	10.6	16.7	3.7	9.4	4.5	11.3	9.1	1.5	7.7	8.8	9.4	8.0	9.8	8.0
$2,000- $2,999	35	5	1	9	8	9	11	17	6	1	17	8	10	10	24
	6.6	5.9	1.2	11.1	12.5	5.8	6.2	7.0	9.2	2.6	6.8	4.7	10.0	4.9	7.7
$3,000- $3,999	7		1	2	2	2	2	3	1	1	6	1		1	6
	1.3		1.2	2.5	3.1	1.3	1.1	1.2	1.5	2.6	2.4	.6		.5	1.9
$4,000- $4,999	14	2	2	6	1	2	3	8	2		5	7	1	4	10
	2.6	2.4	2.4	7.4	1.6	1.3	1.7	3.3	3.1		2.0	4.1	1.0	2.0	3.2
$5,000- $9,999	35	2	6	2	9	12	6	22	4	3	20	11	4	16	19
	6.6	2.4	7.1	2.5	14.1	7.8	3.4	9.1	6.2	7.7	8.0	6.4	4.0	7.8	6.1
$10,000- $19,999	20		6	2	1	11	3	9	7	1	9	8	2	9	11
	3.8		7.1	2.5	1.6	7.1	1.7	3.7	10.8	2.6	3.6	4.7	2.0	4.4	3.5
$20,000- $29,999	14	3	3	2		6	4	8	1	1	7	5	2	6	7
	2.6	3.5	3.6	2.5		3.9	2.3	3.3	1.5	2.6	2.8	2.9	2.0	2.9	2.2
$30,000- $49,999	4	1	1	1	1		2	2			2	2		1	2
	.8	1.2	1.2	1.2	1.6		1.1	.8			.8	1.2		.5	.6
$50,000 OR MORE	10	2		3		4	3	6		1	5	5		5	4
	1.9	2.4		3.7		2.6	1.7	2.5		2.6	2.0	2.9		2.5	1.3
NOT REPORTED	206	26	27	25	20	69	64	88	32	20	105	61	35	91	112
	38.9	30.6	32.1	30.9	31.3	44.8	36.2	36.2	49.2	51.3	42.0	35.7	35.0	44.6	35.8
MEAN (INCLUDING NOTHING)	6.9	7.3	3.8	9.3	2.8	9.0	6.4	7.5	4.5	10.8	7.4	9.5	1.7	8.4	5.4

ADDITIONAL MICROCOMPUTER EXPENDITURES BUDGETED IN 1986 FOR.. MICRO SOFTWARE FOR WORD PROCESSING

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION			YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORP-ORATE HEAD-QUAR-TERS	DIVI-SION SUB-SID-IARY/ BR-ANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARL-IER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529	85	84	81	64	154	177	243	65	39	250	171	100	204	313
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
NOTHING	100	26	15	13	16	26	37	43	10	9	38	35	26	30	65
	18.9	30.6	17.9	16.0	25.0	16.9	20.9	17.7	15.4	23.1	15.2	20.5	26.0	14.7	20.8
UNDER $2,000	41	12	9	7	4	4	25	14	1	1	14	17	10	17	24
	7.8	14.1	10.7	8.6	6.3	2.6	14.1	5.8	1.5	2.6	5.6	9.9	10.0	8.3	7.7
$2,000- $2,999	26	8	2	4	3	6	10	14	1		13	7	6	8	17
	4.9	9.4	2.4	4.9	4.7	3.9	5.6	5.8	1.5		5.2	4.1	6.0	3.9	5.4
$3,000- $3,999	14	1	5	2	1	3	6	5	2	1	8	4	2	3	11
	2.6	1.2	6.0	2.5	1.6	1.9	3.4	2.1	3.1	2.6	3.2	2.3	2.0	1.5	3.5
$4,000- $4,999	10	1	2	3	2	2	1	7	2		5	3	2	4	6
	1.9	1.2	2.4	3.7	3.1	1.3	.6	2.9	3.1		2.0	1.8	2.0	2.0	1.9
$5,000- $9,999	33	3	5	8	4	11	9	20	2	2	13	10	9	11	21
	6.2	3.5	6.0	9.9	6.3	7.1	5.1	8.2	3.1	5.1	5.2	5.8	9.0	5.4	6.7
$10,000- $19,999	56	2	14	9	9	21	14	28	10	4	27	21	8	18	36
	10.6	2.4	16.7	11.1	14.1	13.6	7.9	11.5	15.4	10.3	10.8	12.3	8.0	8.8	11.5
$20,000- $29,999	15	2	2	1	3	4	4	9		1	10	2	2	6	9
	2.8	2.4	2.4	1.2	4.7	2.6	2.3	3.7		2.6	4.0	1.2	2.0	2.9	2.9
$30,000- $49,999	13	2	2	4	1	2	2	7	4		7	6		5	8
	2.5	2.4	2.4	4.9	1.6	1.3	1.1	2.9	6.2		2.8	3.5		2.5	2.6
$50,000 OR MORE	15	2	1	5	1	6	5	8	1	1	10	5		11	4
	2.8	2.4	1.2	6.2	1.6	3.9	2.8	3.3	1.5	2.6	4.0	2.9		5.4	1.3
NOT REPORTED	206	26	27	25	20	69	64	88	32	20	105	61	35	91	112
	38.9	30.6	32.1	30.9	31.3	44.8	36.2	36.2	49.2	51.3	42.0	35.7	35.0	44.6	35.8
MEAN (INCLUDING NOTHING)	10.5	7.1	6.9	15.3	9.3	13.3	7.7	12.2	11.0	12.1	14.0	10.1	3.2	15.7	7.8

ADDITIONAL MICROCOMPUTER EXPENDITURES BUDGETED IN 1986 FOR.. MICRO SOFTWARE FOR COMMUNICATIONS

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION			YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORPORATE HEAD-QUARTERS	DIVISION SUB-SIDIARY/ BR-ANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARLIER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529	85	84	81	64	154	177	243	65	39	250	171	100	204	313
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
NOTHING	143	34	24	18	26	31	62	57	14	9	61	44	37	47	93
	27.0	40.0	28.6	22.2	40.6	20.1	35.0	23.5	21.5	23.1	24.4	25.7	37.0	23.0	29.7
UNDER $2,000	39	8	8	5	3	11	14	17	4	3	17	13	9	14	24
	7.4	9.4	9.5	6.2	4.7	7.1	7.9	7.0	6.2	7.7	6.8	7.6	9.0	6.9	7.7
$2,000- $2,999	30	5	6	6	3	7	12	15	2	1	17	8	5	12	17
	5.7	5.9	7.1	7.4	4.7	4.5	6.8	6.2	3.1	2.6	6.8	4.7	5.0	5.9	5.4
$3,000- $3,999	15		4	4	5	2	4	9	2		6	8	1	6	8
	2.8		4.8	4.9	7.8	1.3	2.3	3.7	3.1		2.4	4.7	1.0	2.9	2.6
$4,000- $4,999	6	2	1	2			1	3	1			3	2	3	2
	1.1	2.4	1.2	2.5			.6	1.2	1.5			1.8	2.0	1.5	.6
$5,000- $9,999	35	3	5	8	3	15	7	24	3	1	14	16	5	8	26
	6.6	3.5	6.0	9.9	4.7	9.7	4.0	9.9	4.6	2.6	5.6	9.4	5.0	3.9	8.3
$10,000- $19,999	33	4	5	7	2	13	8	18	4	3	20	9	3	13	20
	6.2	4.7	6.0	8.6	3.1	8.4	4.5	7.4	6.2	7.7	8.0	5.3	3.0	6.4	6.4
$20,000- $29,999	12	1	2	3	1	4	4	4	2	2	3	6	3	4	8
	2.3	1.2	2.4	3.7	1.6	2.6	2.3	1.6	3.1	5.1	1.2	3.5	3.0	2.0	2.6
$30,000- $49,999	4	1	2	1			1	2	1		3	1		2	1
	.8	1.2	2.4	1.2			.6	.8	1.5		1.2	.6		1.0	.3
$50,000 OR MORE	6	1		2	1	2		6			4	2		4	2
	1.1	1.2		2.5	1.6	1.3		2.5			1.6	1.2		2.0	.6
NOT REPORTED	206	26	27	25	20	69	64	88	32	20	105	61	35	91	112
	38.9	30.6	32.1	30.9	31.3	44.8	36.2	36.2	49.2	51.3	42.0	35.7	35.0	44.6	35.8
MEAN (INCLUDING NOTHING)	5.1	3.2	4.0	6.6	5.5	6.4	2.6	7.1	4.8	4.5	6.6	4.8	2.2	6.4	4.3

TABLE- A24
SECTION- 2 QUESTION- 1

EVALUATIONS CURRENTLY ASSUMED BY INFORMATION CENTER

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION				
														YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORP-ORATE HEAD-QUAR-TERS	DIVI-SION SUB-SID-IARY/ BR-ANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARL-IER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529 100.0	85 100.0	84 100.0	81 100.0	64 100.0	154 100.0	177 100.0	243 100.0	65 100.0	39 100.0	250 100.0	171 100.0	100 100.0	204 100.0	313 100.0
MICRO HARDWARE	445 84.1	70 82.4	66 78.6	74 91.4	59 92.2	127 82.5	148 83.6	214 88.1	50 76.9	30 76.9	218 87.2	139 81.3	81 81.0	165 80.9	270 86.3
MICRO SOFTWARE	484 91.5	72 84.7	75 89.3	77 95.1	63 98.4	143 92.9	157 88.7	232 95.5	57 87.7	35 89.7	234 93.6	154 90.1	89 89.0	184 90.2	289 92.3
MAINFRAME/MINI HARDWARE	189 35.7	33 38.8	28 33.3	27 33.3	20 31.3	59 38.3	69 39.0	74 30.5	32 49.2	14 35.9	85 34.0	64 37.4	39 39.0	86 42.2	95 30.4
MAINFRAME/MINI SOFTWARE	323 61.1	45 52.9	48 57.1	48 59.3	45 70.3	101 65.6	101 57.1	149 61.3	41 63.1	29 74.4	158 63.2	99 57.9	64 64.0	150 73.5	163 52.1
NONE OF THESE	22 4.2	8 9.4	4 4.8	3 3.7		4 2.6	10 5.6	6 2.5	4 6.2	1 2.6	6 2.4	8 4.7	7 7.0	9 4.4	13 4.2

TABLE- A25
SECTION- 2 QUESTION- 1

AUTHORIZATIONS CURRENTLY ASSUMED BY INFORMATION CENTER

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION			YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORP-ORATE HEAD-QUAR-TERS	DIVI-SION SUB-SID-IARY/ BR-ANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARL-IER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529	85	84	81	64	154	177	243	65	39	250	171	100	204	313
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
MICRO HARDWARE PURCHASES	361	54	50	60	52	108	118	176	39	25	186	103	66	132	220
	68.2	63.5	59.5	74.1	81.3	70.1	66.7	72.4	60.0	64.1	74.4	60.2	66.0	64.7	70.3
MICRO SOFTWARE PURCHASES	386	58	63	60	52	115	128	183	46	26	191	116	73	141	237
	73.0	68.2	75.0	74.1	81.3	74.7	72.3	75.3	70.8	66.7	76.4	67.8	73.0	69.1	75.7
MAINFRAME/MINI HARDWARE PURCHASES	107	23	10	9	15	40	32	44	16	15	44	35	26	53	50
	20.2	27.1	11.9	11.1	23.4	26.0	18.1	18.1	24.6	38.5	17.6	20.5	26.0	26.0	16.0
MAINFRAME/MINI SOFTWARE PURCHASES	185	31	18	29	29	61	58	81	25	20	89	49	45	96	85
	35.0	36.5	21.4	35.8	45.3	39.6	32.8	33.3	38.5	51.3	35.6	28.7	45.0	47.1	27.2
MICRO/MAINFRAME LINKAGES	331	45	48	56	48	100	102	161	41	24	165	93	67	135	188
	62.6	52.9	57.1	69.1	75.0	64.9	57.6	66.3	63.1	61.5	66.0	54.4	67.0	66.2	60.1
USE OF MICROS	333	55	49	54	47	91	116	161	39	14	169	96	65	121	204
	62.9	64.7	58.3	66.7	73.4	59.1	65.5	66.3	60.0	35.9	67.6	56.1	65.0	59.3	65.2
USE OF MAINFRAME TERMINALS	182	32	35	22	24	51	68	84	17	13	82	56	42	81	94
	34.4	37.6	41.7	27.2	37.5	33.1	38.4	34.6	26.2	33.3	32.8	32.7	42.0	39.7	30.0
DOWNLOADING CORPORATE DATA	321	47	55	53	46	88	114	152	31	21	161	87	68	125	188
	60.7	55.3	65.5	65.4	71.9	57.1	64.4	62.6	47.7	53.8	64.4	50.9	68.0	61.3	60.1
UPLOADING DATA TO CORPORATE DATABASE	224	33	38	41	31	57	78	108	18	19	118	53	51	89	129
	42.3	38.8	45.2	50.6	48.4	37.0	44.1	44.4	27.7	48.7	47.2	31.0	51.0	43.6	41.2
NONE OF THESE	56	11	6	8	5	16	17	22	11	4	20	29	5	20	36
	10.6	12.9	7.1	9.9	7.8	10.4	9.6	9.1	16.9	10.3	8.0	17.0	5.0	9.8	11.5

TABLE- A26
SECTION- 2 QUESTION- 3

WHETHER BEFORE PURCHASING ANY END-USER COMPUTING TOOLS-- THE INFORMATION CENTER MUST BE CONSULTED (FOR HARDWARE)

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION			YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORP-ORATE HEAD-QUAR-TERS	DIVI-SION SUB-SID-IARY/ BR-ANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARL-IER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529	85	84	81	64	154	177	243	65	39	250	171	100	204	313
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
YES	391	63	59	67	54	107	135	190	43	21	193	124	68	151	229
	73.9	74.1	70.2	82.7	84.4	69.5	76.3	78.2	66.2	53.8	77.2	72.5	68.0	74.0	73.2
NO	131	19	24	13	10	46	38	51	22	18	54	45	31	50	80
	24.8	22.4	28.6	16.0	15.6	29.9	21.5	21.0	33.8	46.2	21.6	26.3	31.0	24.5	25.6
NO RESPONSE	7	3	1	1		1	4	2			3	2	1	3	4
	1.3	3.5	1.2	1.2		.6	2.3	.8			1.2	1.2	1.0	1.5	1.3

WHETHER BEFORE PURCHASING ANY END-USER COMPUTING TOOLS-- THE INFORMATION CENTER MUST BE CONSULTED

(FOR SOFTWARE)

		ORGANIZATIONS ANNUAL SALES					NUMBER OF EMPLOYEES AT WORKSITE				DESCRIPTION			YEAR INFO-CENTER WENT OPERATIONAL	
	TOTAL	UNDER $50 MILL.	$50 MILL. TO $199 MILL.	$200 MILL. TO $499 MILL.	$500 MILL. TO $1 BILL.	MORE THAN $1 BILL.	FEWER THAN 500	500 TO 2,499	2,500 TO 5,000	MORE THAN 5,000	CORPORATE HEADQUARTERS	DIVISION SUBSIDIARY/ BRANCH	ALL MAJOR UNITS IN ONE LOC.	1983 AND EARLIER	1984 OR LATER
BASE- TOTAL RESPONDENTS	529 100.0	85 100.0	84 100.0	81 100.0	64 100.0	154 100.0	177 100.0	243 100.0	65 100.0	39 100.0	250 100.0	171 100.0	100 100.0	204 100.0	313 100.0
YES	367 69.4	64 75.3	56 66.7	58 71.6	48 75.0	102 66.2	128 72.3	175 72.0	40 61.5	22 56.4	176 70.4	120 70.2	65 65.0	138 67.6	220 70.3
NO	152 28.7	18 21.2	28 33.3	21 25.9	14 21.9	50 32.5	44 24.9	65 26.7	24 36.9	17 43.6	69 27.6	49 28.7	33 33.0	63 30.9	86 27.5
NO RESPONSE	10 1.9	3 3.5		2 2.5	2 3.1	2 1.3	5 2.8	3 1.2	1 1.5		5 2.0	2 1.2	2 2.0	3 1.5	7 2.2

The AMA Sample

Business Activity	Pct. of Sample	No. in Sample
Banking and Finance	11.3%	60
Communications/Publishing	2.5%	13
Diversified Conglomorate	4.3%	23
Education	5.5%	29
Electronics	4.2%	22
Entertainment/Recreation/Lodging		
Food Processing/Agribusiness	2.1%	11
Government and Military	11.2%	59
Health Care and Medical	6.2%	33
Insurance	10.4%	55
Manufacturing: Industrial Goods	10.8%	57
Manufacturing: Consumer Goods	6.4%	34
Manufacturing (Net)	(17.2%)	(91)
Mineral Extraction/Processing	2.5%	13
Professional Services	1.5%	8
Trade (Wholesale/Retail)	3.4%	18
Transportation/Distribution	2.3%	12
Utilities	8.1%	43
Other	5.9%	31
Not Reported	0.4%	2

TABLE A. The AMA Sample By Business Activity

AMA Membership Publications Division
American Management Association
135 West 50th Street, New York, N.Y. 10020

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